THE JOURNAL

OF THE

Department of Agriculture

OF SOUTH AUSTRALIA.

VOL. XXXIX. NOVEMBER, 1935. No. 4.

Published Monthly by the Department of Agriculture.

Edited by H. C. PRITCHARD.

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A. P. BLESING,

Minister of Agriculture.

AGRICULTURAL VIEWS AND COMMENTS.

MISCELLANEOUS.

Agricultural Shows.

We have been advised by Secretaries of Agricultural Show Societies that their shows will be held on the following dates:—

Angaston, Saturday, February 29th, 1936.
Mundalla, Wednesday, March 4th, 1936.
Mount Pleasant, Thursday, March 19th, 1936.

Fig Wasps.

Seeking information on the supply of fig wasps for Smyrna figs, the Secretary of the *Koppio Branch of the Agricultural Bureau* has been advised by the Chief Horticultural Instructor (Mr. A. G. Strickland, M.Sc.) that:—

"Supplies of wasps can be obtained from the State Experiment Orchard, Blackwood. The brood from the winter figs emerges in September, and the second brood from the spring figs is available in December.

It would be necessary to maintain a supply of wasps from year to year to have a number of Capri fig trees in the Smyrna fig plantation, as the fig wasp goes through its life cycle three times in a year, and the Capri fig produces three crops of figs for this purpose."

Agricultural Bureau Exhibit, Royal Spring Show, 1936.

The Royal Agricultural Society has set aside the sum of £400 for prize money and organising expenses for displays by Branches of the Agricultural Bureau at the 1936 Show. A first prize of £100 and a second prize of £50, plus a distribution of £250 between competing Branches, are offered. This distribution, which is to assist Branches to meet expenses in organising and staging their exhibits, is to be distributed as follows:—

£50 to each competing Branch which secures 50 per cent. or more of the maximum marks, unless more than five Branches compete, in which case the sum of £250 will be equally divided amongst all competitors. Prize winners share in this allocation.

Entries, which are received subject to the approval of the Society, should be addressed to the Secretary at the earliest convenient opportunity.

The Society reserves the unquestioned right to limit or restrict the number of entries accepted, and to refuse to accept any entry without assigning any reason therefor.

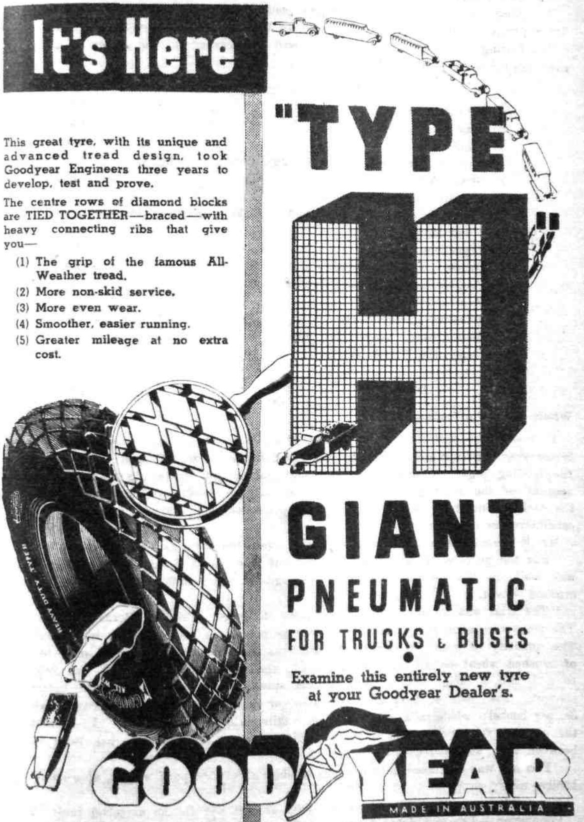
Conditions.

(1) Exhibits may consist of any or all of the articles referred to in the scale of points set out below.

(2) All exhibits must be actually produced and/or manufactured on the farms of members of the competing Branch, excepting that articles manufactured in the district served by the Branch, but not manufactured on the farms of members, may be displayed, but will not be taken into account in judging except under items (12) and (13) of the scale of points.

(3) Exhibits of Wheat, Oats, and Barley must be representative of a bulk of not less than 150bush. of each, and exhibits of chaff and hay representative of not less than 10 tons of each.

(4) All exhibits must be of the current season's growth, except wool, which may be of the preceding year's clip.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(5) Exhibitors will be required to make a statutory declaration to the effect that the foregoing conditions are complied with in every respect.

(6) *Space.*—The Society will provide a floor space of 45ft. x 15ft. for each exhibit.

(7) No Government institution will be allowed to participate in this competition.

(8) *Staging.*—Exhibits must be staged ready for judging by 9 a.m. on Saturday, 5th September, 1936, and may be removed on Monday, 14th September, 1936, at 9 a.m.

(9) During the progress of judging, it will be necesary for the officer in charge of each exhibit to be in the hall.

SCALE OF POINTS FOR JUDGING.

(1) Cereals (Grain and in Sheaf)	150
(2) Hay, Chaff, and Silage	100
(3) Wool	100
(4) Dairy Produce, Bacon, Hams, Eggs, Lard, Dripping, &c.	150
(5) Green Fodders, Grasses, &c.	50
(6) All other Grains and Seeds	50
(7) Fruits (Fresh and Preserved), Pickles, Sauces, Jams, and Honey	50
(8) Vegetables and Roots	50
(9) Drinks (including Wine)	50
(10) Produce not otherwise specified	50
(11) Home-made devices	50
(12) Effective arrangements	100
(13) Discretionary points for any outstanding feature not specifically provided for	50
Total	1,000

Whole Milk Pig-feeding Trial.

In accordance with the wishes of the Hon. Minister, a trial was carried out at Roseworthy Agricultural College to test the relative merits of skim and whole milk for feeding pigs. Actually the trial could not be put on a big enough scale on account of the shortage of whole milk, but as the results are strikingly different the lack of numbers in the experimental pens does not detract greatly from the conclusiveness of the results.

Mr. R. Baker (Dairying Instructor), who conducted the trial, reports as follows:—

"For the purpose of estimating the value of whole milk fed to pigs, a comparison was made in the feeding of whole milk against skim milk, with the basal food crushed wheat.

"The trial was carried out with two pens of Large White x Berkshire weaners. The pens were arranged to provide as near as possible a corresponding initial weight. The quantity of milk fed during the test was in the ratio of 2lbs. of milk to one of crushed wheat on all but two occasions, when the quantity of milk was reduced to a 1 and 1 ratio. The whole milk was standardised to a 4 per cent. butterfat content. The costs of food were estimated on the following prices:—Crushed wheat, 3s. per bushel; whole milk, 6d. per gallon; skim milk, 1d. per gallon. In estimating the cost of food per pound of pork a difference of 30 per cent. has been taken between pork and increase.

"Feeding was continued until the pigs reached a forward pork weight, approximately 120lbs. live."

From this experiment the figures obtained are set out in the attached table.

Conclusion.—The significant feature of the results is that it cost 5.38d. to produce 1lb. of pork when feeding whole milk and wheat, whereas it cost only 2.60d. to produce 1lb. of pork when feeding skim milk and wheat. The conclusion to be drawn from this work is that feeding pigs on whole milk is far too expensive, and is therefore uneconomical. Similar results can be obtained with skim milk at less than half the cost.

THE FEEDING OF PIGS ON WHOLE MILK.

Ration.	Days Fed.	Initial Weight.	Final Weight.	Increase.	Increase. per Day.	Ration.	Quantity of Food Consumed.	Quantity of Food per Day.	Cost of Food per Day.	Quantity of Food per Lb. of Increase.	Cost of Food per Lb. of Increase.	Cost of Food per Lb. of Pork.
		Lbs.	Lbs.	Lbs.	Lbs.		Lbs.	Lbs.	Pence.	Lbs.	Pence.	Pence.
Whole milk, 1;	51	44	127	83	1·62	Whole milk	688	13·50	8·10	4·14	2·484	5·38
and Wheat, 2	—	27	110	83	1·62	and Wheat	356	6·98	4·18	2·14	1·284	—
Total	—	71	237	166	3·24	Total ...	—	—	12·28	—	3·768	—
Skim Milk, 1:	51	40	122	82	1·61	Skim Milk	712	13·96	1·39	4·45	·445	2·60
and Wheat, 2	—	37	115	78	1·53	and Wheat	368	7·21	4·32	2·30	1·380	—
Total	—	77	237	160	3·14	Total ...	—	5·7	5·71	—	1·825	—

Fertilizer Bounty.

Advice has been received from the Prime Minister's Department that under the provisions of the Primary Producers' Relief Bill submitted to the Federal Parliament £275,000 will be paid to the State Governments for distribution to primary producers, other than wheatgrowers, at the rate of 15s. per ton on fertilisers used during the current financial year. The bounty will be paid on half-ton lots.

Chaffed Barley Straw and Grain v. Wheat or Oaten Straw.

Replying to the Secretary of the Brentwood Branch of the Agricultural Bureau, who asked whether barley straw (Prior) was as nutritious when chaffed and fed with grain, as wheat or oaten straw, Professor Perkins (Director of Agriculture) says:—

"In the first place it must be noted that no straw that has carried well-ripened grain can be looked upon as having much nutritive value for livestock, chiefly because it contains a very high proportion of indigestible fibre; nevertheless, it can be fed in absence of any better material in conjunction with crushed grain or other concentrates. Of the three types of straw mentioned, barley or oaten straw are approximately of the same value from a feed point of view, and wheat straw of less value than either barley or oat straw.

"It can be added, too, that both barley and oaten straw are more readily accepted by livestock than wheat straw."

St. John's Wort.

Replying to a question submitted at the Butler Conference, Mr. R. C. Scott (Supervisor of Experimental Work) stated that the authorities had provision, by means of the Noxious Weeds Act, for the eradication of St. John's Wort where such eradication was economically possible.

St. John's Wort was a proclaimed noxious weed in South Australia. The Act was administered by district councils, but if they did not take action, there was provision under which the Local Government Department could compel them to do so. Everything depended upon the extent of the infestation and whether it was a reasonable proposition to attempt destruction. In order to check the spread of St. John's Wort, councils must take action when any new area was discovered. If they failed to do so, the matter should be reported to the Local Government Deparment in the interests of the district as a whole.

Other work that had been done to assist in the eradication of St. John's Wort had been a series of experiments with plant poisons. Whilst a sodium chlorate solution was effective in destroying this plant, when applied early in the season, the cost was too great to allow for general recommendation. The matter of controlling the pest by insect parasites had been taken up by the Council for Scientific and Industrial Research, and promising results with a species of beetles (*Chrysomela*) had been obtained. In the laboratories these beetles lived entirely on St. John's Wort and failed to survive when this plant was finished, notwithstanding the fact that other green stuff was available. The work was being continued, and the result after liberation in the field would be of considerable importance.

Trunk Calls from Multi-Coin Collector Public Telephones.

The Postmaster-General's Department has recently installed at various country centres a device known as a Multi-Coin Collector. This device is associated with the public telephone circuit and enables trunk line and other calls to be originated during such times as the local office is closed. There are two types of collectors in use—one is installed at post offices where rural automatic telephone exchange facilities have been established. The offices in South Australia at the present moment are Willunga, Noarlunga, Macclesfield, and Birdwood. The other type, known as the Magneto Multi-Coin Collector, is installed at offices where a manually operated exchange is in use, but where attendance at the exchange is limited to, say, 9 a.m. to 8 p.m. or 9 a.m. to 6 p.m.

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The coin collecting devices are each provided with three slots—one of which is for shillings, another for sixpences, and a third for pennies.

In the case of those installed in connection with rural automatic exchange facilities two press buttons are provided—one marked "A," and the other marked "B." In the case of the Magneto Multi-Coin devices only one button is provided, *i.e.*, button "B."

The system of operation is briefly as follows:—A person wishing to make a call after hours calls the telephonist at the controlling exchange, which is continuously staffed; he then advises her as to the number he wishes to call and then deposits coins of the necessary denomination to pay for the call in their respective slots. The telephonist checks the number and value of the coins deposited by means of tones heard as the coins drop into the machine. If the call can be connected the telephonist requests the caller, if using the automatic type of telephone, to press button "A." When this button is operated the coins fall into a receptacle provided for them. If the call is ineffective, the telephonist at the control centre will ask the caller to press button "B"; when this button is pressed the coins drop into a chute on the front of the coin collector where they may be recovered by the caller.

In the case of the Magneto Coin Collectors, the depositing key, button "A." is installed at the controlling exchange; this simplifies the use of the instrument by the caller, but with this exception the operation of the two types of instrument is practically identical.

Devices of the Magneto Type have been installed at Port Noarlunga, Reynella, Roseworthy, Greenock, Keyneton, Mundalla, and Echunga, and it is anticipated that similar equipment will be installed at other suitable offices at a later date.

Notice to Tobacco Growers.

Growers of tobacco seedlings are reminded that should they wish to sell plants, they are required by the regulations under the Tobacco Industry Protection Act to notify the Director of Agriculture, as laid down in regulation No. 2, at least four days prior to any sale or disposal of seedlings being made.

Unregistered growers should notify the Department immediately of their intentions.

The following preparation of Home-made Colloidal Copper Solution will be found beneficial in the prevention of the Blue Mould disease:—

A stock solution of this fungicide is first prepared, and is diluted with water for spraying purposes. A grower may consequently make up sufficient concentrated fungicide for two or three months' spraying operations at one time.

Details for the preparation of the stock solution are as follows:—1lb. of bluestone "fines" is first dissolved in 2 quarts of water. The "fines" are preferable to crystals, since they dissolve more readily. The bluestone is best dissolved by suspending it in a bag in water which may be heated to accelerate the process. It should be dissolved in a wooden tub or some non-metallic vessel, since this chemical will react with metals. If tins are the only vessels available, they must first be thoroughly coated with pitch. One pint of molasses is next stirred well into the bluestone solution. The solution is finally made slightly alkaline by the addition of a caustic soda solution prepared by dissolving 5ozs. of caustic soda in a quart of water. The caustic soda solution must be added slowly to the bluestone and molasses mixture, with constant stirring.

The above-mentioned quantities will make up about a gallon of stock solution, and should result in a slightly alkaline spray. The additional precaution of carefully adjusting the reaction of the spray may be carried out in this fashion:—

When almost all the caustic soda solution has been added, transfer a drop of the mixture to a piece of blue litmus paper. The colour of the paper should turn pink. Add more caustic soda solution until, when tested, the mixture will not change the colour of the litmus paper. A drop of the mixture should then be transferred to a piece of pink litmus paper, which will probably not change colour. Then a little more caustic soda solution is added so that eventually pink litmus paper will turn very faintly blue. (Litmus papers may be obtained cheaply from chemists.)

The stock solution so prepared should be stored in bottles or some closed non-metallic container. Since it will improve on ageing, it should not be used until it is about a week old, when the colour will have changed from green to slightly yellow. In the Departmental experiments stock solution was found to be satisfactory even six to thirteen weeks after preparation.

For spraying purposes the stock solution should be vigorously agitated, and 1 part diluted in 30 parts of water, and 0.5 per cent. by weight of potash soft soap added as a spreader.

A formula for preparing about 8 gallons of spray is as follows:—

A.—Stock solution, 1 quart; water, 7 gallons.

B.—Potash soft soap, 6ozs.; water, ½ gallon.

When the soap has been dissolved in the water, which may be heated to save time, solution B is added and well mixed with solution A. It is advisable to pump the spray through the spray pump back into the spray vat for this purpose.

Seedlings throughout South Australia are reported to be doing particularly well so far this season. The Department of Agriculture and a number of growers are trying out the Benzol fume treatment for the prevention of Blue Mould. Any information required can be obtained upon application to the Tobacco Instructor at the Department in Adelaide.

Heavy and Green Yolks in Eggs.

Asking for an explanation of the above terms, the Wasleys Branch of the Agricultural Bureau has been advised by the Government Poultry Expert (Mr. C. F. Anderson) that the terms "heavy" and "green" yolks in eggs are trade descriptions of the contents of the egg as shown when candled.

The heavy yolk refers to the one which appears much denser and darker than the yolk of an ordinary egg, which, although it appears firm, is almost transparent when the egg is broken. The heavy yolk egg will run while the yolk of an ordinary egg will remain firm.

The term "green" refers to the colour of the yolk. On being candled, a percentage of eggs shows a little darkness in the yolk, varying in colour under the light from a light-green to an olive-green yolk. When the eggs are broken, the green colour of the yolk shows up much more prominently.

There is no doubt that with the stricter testing of eggs now being practised, a number of faults are being found which, in previous years when the testing was not so severe, were allowed to pass.

Publications Received.

The Library of the Department of Agriculture acknowledges the receipt of—

*Bulletin No. 89: "Osiers and Willows," price 9d.

*Bulletin No. 91: "Table Poultry Production," price 1s.

Published by Ministry of Agriculture, England.

World's Grain Exhibition and Conference, Part II.

Rothamsted Experimental Station: Annual Report, 1934, price 2s. 6d. Copies obtainable from the Secretary, Lawes Agricultural Trust, Harpenden, England.

AGRICULTURAL INQUIRIES.

[Replies supplied by W. J. Spafford, Deputy Director of Agriculture.]

Macaroni Wheats.

Alawoona Conference: "What wheats suitable for making macaroni are suitable for growing in low-rainfall areas, and is there a ready market for same?"

Reply—There are only two important Macaroni Wheats in South Australia, namely, Huguenot and Indian Runner, but unfortunately neither of these are really suitable

for low-rainfall districts. Other than these, Forel has been tried in many districts of the State, and there are dozens of other varieties grown in small plots. In other countries Macaroni Wheats are looked upon as drought-resistant, as well as being rust resistant, but to date we have not found one which will give consistently good grain yields without more than the usual amount of rain received in our low-rainfall areas. In any case, there is a limited market only for Macaroni Wheats in Australia, and so the unlimited growth of these wheats cannot be recommended.

Pasture Plants and Top-dressing for the Colton District.

"Would top-dressing be worth while in the Colton District?"

Reply—Top-dressing would prove an economic proposition in the Colton District, but it would be better done in association with the establishment of some pastures such as Lucerne, or a mixture of King Island Melilot and Wimmera Rye Grass

"How should Lucerne be established in this district?"

Reply—In the sandy portions of the Colton District the area to be seeded to Lucerne should be sown to barley or any one of the cereals which would be harvested for grain The stubble should on no account be burnt, but if at all heavy, should be grazed to thin it out, care being taken not to remove all of the straw. After the first seeding rain in April or May, a mixture of 5lbs. or 6lbs. Lucerne seed and 1cwt. Super should be drilled in to the acre, with a disc drill. In heavier land the Lucerne could be sown in a stubble, but better results should be secured if the land was fallowed for the Lucerne.

"What other pastures could be grown?"

Reply—A mixture of 3lbs. King Island Melilot, 6lbs. Wimmera Rye Grass, and 1cwt Super drilled in to the acre would produce heavy pastures in the Colton District. This should be drilled in during the autumn, and if regularly top-dressed should be permanent. Although both plants are only annuals, they seed themselves down with the certainty that other weeds do.

"How much Super should be used per acre for top-dressing?"

Reply—If good stands of Lucerne or the mixture of Melilot and grass are to be secured, 1cwt. per acre per year should prove a business proposition, but if the top dressing is to be done on natural pasture, 60-70lbs. per acre per year should be sufficient.

"When should the Super be applied?"

Reply—Best results would follow applications of Super to pastures given in the autumn. When there is plenty of growth, green or dry, to hold the fertiliser, it could be applied as early as February, but April would probably be the best time of the year

Weevils in Farm Buildings.

Mr. R. C. Scott, Supervisor of Experimental Work, has supplied the following replies to questions submitted by the Hartley Branch of the Agricultural Bureau:—

"How to deal with weevils in a stone building with a wooden floor?"

Reply—Weevils are most effectively destroyed in buildings which are not sufficiently airtight to permit fumigation by dusting with copper carbonate powder. This is the same material as is used for the pickling of wheat, and, being of a very fine nature, sifts into the cracks and crevices of the walls, killing the weevils with which it comes in contact.

Super versus Super and Sulphate of Ammonia.

"What would give the better results on stubble ground, 1cwt. Super or ¾cwt. Super and ¼cwt. Sulphate of Ammonia?"

Reply—Experiments dealing with the use of Sulphate of Ammonia on stubble-sown crops are now in progress, and the result of previous trials appears to indicate that everything depends upon the nature of the pasture or previous crops which the field has carried.

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If the pasture includes a high proportion of leguminous plants, such as Burr Clover, Melilotus, &c., or if a pea crop has been planted recently, there is no need to add Nitrogen in the fertiliser applied with the stubble crop. In any case, the quantity of Super would not be reduced, and as ½cwt. of 3 to 1 mixture only contains 42lbs. of Super, this dressing is not likely to give equal results with a 1cwt. of Super application, even if Sulphate of Ammonia was required.

Feeding Value of Cape Barley.

"Is Californian Cape Barley equal to English Malting Barley for feeding to Pigs?"

Reply—Californian Cape Barley has not been analysed, but is almost sure to be very similar to ordinary Cape Barley in composition. Assuming this to be the case, it would not quite equal English Malting Barley as a foodstuff for pigs. The relative general composition of these two grains is as follows:—

	Malting Barley. Per cent.	Cape Barley. Per cent.
Mineral matter	2.6	4.6
Crude protein	12.0	5.4
Crude fat	2.4	0.6
Fibre	5.0	19.3
Carbohydrate	63.7	56.5

Milling Wheats for the Mallee.

Alawoona Conference: "What are the most suitable wheats of fair milling quality for the district?"

Reply—Of the wheats that should give reasonable returns in this district, and at the same time produce flour of sufficient strength to keep up our name for wheat of fair quality, the following have been proved:—

Ranee is a very hardy variety which will give consistent yields in the district if grown on good fallow, and although the flour of this wheat is not of high strength, it is of fair quality and good colour. This could be the main variety on most farms if good tillage methods are followed.

Gluyas still remains the best very early variety for low rainfall conditions, but is only of fair quality as a flour wheat.

Sword is sufficiently hardy to be a good yielder, and although the strength of its flour is not particularly high, it is good enough and is of a beautiful white colour.

Felix is early enough for the district and produces fair quality flour.

Ford, if sown early on good fallow, will give good yields, and the strength of its flour is really high compared to most South Australian wheats.

HORTICULTURAL INQUIRIES.

[*Replies supplied by* A. G. STRICKLAND, M.Sc., *Chief Horticultural Instructor.*]

Grafting Loquat Trees.

"Clanfield" asks: Because of the damage done by sparrows to loquats, what variety of fruit could these trees be grafted over to?

Reply—Of the common fruits, Quince and Pear are probably most nearly related. Quince is frequently used as a stock for Loquats, but as the following extract from a report by the Manager of the Blackwood Experiment Orchard will indicate, working in everyt... site direction is not common. If the Loquat trees are on Quince stock—which has carri...

is a possibility—reworking to Pears or Quinces would give a combination of Quince roots, Pear or Quince top, with an intermediate piece of Loquat. The behaviour of such a combination is problematical:—

"Grafting Loquat trees with any other variety of fruit has not come within my experience. We have a collection of Loquats worked on Quince stocks, some of which are doing quite well. Since Loquat will do on Quince, Quince might do on Loquat, and as some varieties of Pears will grow on the Quince stock, a Loquat-Quince Pear combination might be possible. The Pear might do directly on the Loquat, though I have never heard of anyone trying such a combination."

It was suggested to the inquirer that an experiment should be tried with the Pear as the fruit likely to do best on a Loquat stock.

Plant-Eating Grubs.

Specimens of insects submitted by the Blyth Branch of the Agricultural Bureau were reported to be doing extensive damage in farm gardens. These were identified as "Millipedes."

Reply—These animals are closely allied to insects, but differ from them in many respects, notably as regards possession of two pairs of legs to each segment of the body. The food of millipedes is almost entirely of a vegetable nature, either living or dead. They are commonly found in manure, leaf mould, garden rubbish, &c., and are difficult to control.

It has been claimed that a heavy application of lime, thoroughly worked into the soil, will assist in their control; also various soil fumigants such as paradichlorbenzene (usually known as P.D.B.), crude naphthalene, &c., applied to the soil and worked in, have in some instances given temporary check to the pest.

Paradichlorbenezene may be obtained from city suppliers, and one firm also handles a product known as "Seekay" soil fumigant, which may be useful.

When sowing peas or beans, if the seed is well dusted with superphosphate before covering with soil, the Millipedes will probably not attack such seed so readily. Furthermore, the superphosphate will assist the growth of the pea or bean plants.

Plum Tree Dropping Immature Fruits.

The Secretary of the Sutherlands Agricultural Bureau has an almond tree on to which has been grafted apricot and plum. The apricot carries the fruit to maturity, but the fruit of the plum drops off when about the size of a marble.

Reply—There are several factors which may cause plums to drop from the tree at the stage mentioned in this query. However, in view of the isolation of this tree from other plum trees, it is practically certain that the dropping is due to lack of cross-pollination.

Many varieties of plum will not set or carry fruit to maturity unless the blooms are fertilised by pollen from another suitable variety of plum: such process is termed cross-pollination. In order to ensure fruiting of the limb in question, graft on the tree another suitable plum variety, the blooming period of which overlaps with the blooming period of the plum variety already worked on the tree. With such provision, bees and other insects will exchange pollen between blooms of the two plum varieties, and thus enable fruit to be carried to maturity.

Without information as to the variety of plum already attached to the tree, one cannot make a suggestion as to the identity of the new variety to be attached. However, if the inquirer will prepare during next blooming season a bouquet of blossom of a different plum variety, blooming simultaneously with the one in question, immerse such bouquet in a vessel of water, and place in close proximity to the tree, he would be able to determine for himself whether the bouquet variety would be suitable as a pollenizer. If the name of the plum variety is known, advice as to its identity may enable me to suggest a suitable pollenizer.

VETERINARY INQUIRIES.

[Replies supplied by Veterinary Officers of the Stock and Brands Department.]

Secretary, Agricultural Bureau, Appila, asks for particulars for dehorning cattle.

Reply—The ideal time to dehorn cattle is before the calf is 5 days old. Clip the horns around the base of the buttons, slightly moisten the end of a stick of caustic potash, and rub for about a quarter of a minute the tip of each horn alternately, until a red spot shows in the centre of the horn bud; this will be in about five minutes. Care should be taken to rub the centre of the horn and not the sides, also not to have the stick of caustic too moist, for it runs on to the skin and a troublesome sore will result. Wrap a piece of brown paper around the stick to protect the fingers.

Secretary, Arthurton Agricultural Bureau, reports young pigs losing the use of their hind legs.

Reply—Apart from spinal injuries (which are comparatively rare) the most common cause of this condition is a lack of Vitamin A in the foodstuffs supplied. Vitamin A is a substance which is present in cream, fish oils, and carrots. The following treatment of affected animals is recommended:—If possible supply some whole milk in addition to cereals and if this is not possible, give one dessertpoon of cod liver oil twice a day, mixed with the food to each pig for at least 14 days. Early maturing pigs are more liable to be affected owing to the rapid rate of growth, and it is necessary to see that they are supplied with flesh and bone forming foods, such as crushed peas, meat meal, etc. The following mineral mixture also should be provided, and the pigs allowed free access to it:—Sweet bone meal, 10lbs.; charcoal, 10lbs.; common salt, 1lb. Mix thoroughly and place in a cut down tin or some such receptacle.

"Hoyleton" reports 12 year old mare, stiff gait and swelling behind brisket.

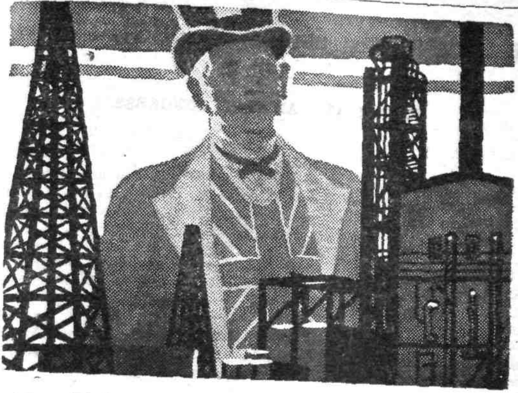
Reply—The following treatment is suggested:—Supplement the green feed with a little chaff, bran, and crushed oats. Also give a daily allowance of 1-1½ pts. of molasses, which should be diluted with water and used to damp the feed. Give the animal 1 teaspoon of powdered sulphate of iron, night and morning for a fortnight. It will probably be necessary to mix the dose with a little honey or molasses to make a paste which can then be placed on the animal's back teeth and tongue. Give half an hour after feeding.

"Koppio" asks is it permissible to mark sheep with numerals for flock marks in other coloured paint than that stipulated for a registered brand?

Reply—The owner of a registered sheep brand may use any of the numerals from 2 to 9 in any colour paint or position without registration, provided that only one numeral is used on any one sheep by each owner. It does not follow that, because the registered brand is in black paint, the numeral must be of the same colour. If he so desires, the owner may use different numerals, colours, and positions for flock marking.

"Borrika" reports lambs 6 weeks old, stiff in limbs after tailing.

Reply—The trouble appears to be that form of arthritis (infection of the joints) which is not uncommonly seen in lambs, not only in this State, but elsewhere, caused by an infection being contracted either through the navel at the time of birth of the lamb, or through wounds inflicted during "marking" operations. In the great majority of cases, recovery takes place within a week or two, leaving the animals apparently none the worse. Some few cases may become chronic, with enlargement of the limb joints. It is not known under what conditions you conduct your lamb-marking operations, i.e., whether you use the same permanent yard year after year for doing this work, or not. If you do, it would be advisable in future years to minimise the chances of repetition of this trouble by carrying out these operations in temporary yards erected with hurdles on some fresh piece of your pastures, at the same time continuing to give the closest possible attention to disinfection of marking knives, other instruments, and workers' hands, etc.



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THE AGRICULTURAL BUREAU OF SOUTH AUSTRALIA

FORTY-SIXTH ANNUAL CONGRESS.

The seating of the Way Hall was taxed to its utmost to accommodate the record crowd of delegates and visitors who attended the first session of the 46th Congress of the Agricultural Bureau of South Australia which was opened by His Excellency the Governor, Major-General Sir Winston Dugan, K.C.M.G., C.B., D.S.O., on Monday, 16th September, at 8 p.m. The Hon. A. L. McEwin, M.L.C. (Chairman of the Advisory Board of Agriculture), presided and accompanying him on the platform were Messrs. J. W. Sandford (Vice-Chairman), Hon. A. P. Blesing, M.L.C. (Minister of Agriculture), A. J. Cooke, R. H. Martin, S. Shepherd, A. J. A. Koch, P. J. Baily, A. M. Dawkins, G. Jeffrey, F. Coleman, Professor A. J. Perkins, Dr. A. E. V. Richardson (Members Advisory Board of Agriculture), C. C. Crane (Organising Secretary of the New South Wales Agricultural Bureau), and officers of the Department of Agriculture.

ATTENDANCE OF DELEGATES.

The following delegates were appointed by their respective Branches and the figures indicate the number of sessions for which attendance cards were recorded:—

Adelaide: J. Y. Hudd 2, O. G. Ayton 1. Alawoona: P. Paull 6, A. J. Pengilly 6. Aldinga: G. Sherriff 2, H. L. Stanfield 1. Allendale East: R. T. Laslett 5, C. N. Wallace 5. Arthurton: D. Noble 4, P. Ford 2. Balaklava: R. Shepherd 0, G. Whiting 0. Balhannah: H. Rollbusch 5, R. James 2. Balumbah: T. N. Wright 2. Barmera: V. Shepherd 0, W. MacGillivray 2. Baroota: S. G. Stone 2, W. H. Spencer 4. Beetaloo Valley: J. Bugg 6. Belvidere: J. W. Collett 0, J. Vivian 0. Berri: E. J. Johnson 5, G. T. Wilkinson 5. Blackheath: H. Paech 5. Black Springs: J. Heinrich 5, P. Abbott 6. Blackwood: J. Turner 0, H. Goldsack 0. Block E: H. Newstead 2, R. Fisher 2. Blyth: R. H. Eime 3, H. A. Zweck 4. Booborowie: H. Phillips 2, W. Kain 0. Booleroo Centre: V. S. Whibley 4, W. A. Mills 5. Boor's Plains: A. Reid 2, C. Rodda 2. Brimpton Lake: E. Ashmann 5, M. Dunstan 4. Brinkley: C. H. Pearson 3, H. D. Humphrey 0. Brownlow: G. Biar 0, R. Smith 0. Buchanan: W. G. Hucks 2, L. V. Bell 0. Bundaleer Springs: M. J. Cronin 3, C. Cooper 4. Bute: M. Green 0, T. H. Trengrove 0. Butler: C. S. Coleman 5, D. B. Butler 5. Caliph: W. H. Todd 2. Chandada: R. R. Loveday 3, H. J. Chewings 2. Chapman's Boor: C. J. Menadue 4, J. P. Krollig 0. Chilpuddie Rock: H. A. Cochrane 6, H. Frost 5. Coomandook: M. F. Ballard 3, J. C. Wilson 4. Coonalpyn: C. C. George 5, G. E. Venning 3. Coonawarra: K. Allder 4, R. Modistach 4. Cummins: K. A. Trigg 5. Cungena: H. R. Patterson 4, D. R. Bennie 3. Dudley: D. I. Telfer 3, L. A. Longbottom 0. Echunga: L. H. Walters 4, C. McDonald 5. Eurelia: C. I. Phillis 3, F. Stainer 5. Frayville: H. B. Scheer 3. Gawler River: F. Wormald 2, K. F. Roediger 0. Gladstone: L. J. Sargent 4, H. M. Wehr 0. Goode: C. P. Linke 5, K. Mundy 4. Greenock: T. W. Roennfeldt 2, A. Nenke 6. Green Patch: C. L. Whillas 3, L. Darrington 4. Gumeracha: W. L. Hanna 2, R. G. Almond 0. Han: L. Turner 4, W. Woolacott, jun., 5. Hope Forest: H. J. Hunter 4, S. Coad 4. Inman Valley: S. F. Hacklin 3, W. F. Roads 0. Jamestown: A. J. Symonds 4, A. N. Sandercock 4. Kalangadoo: W. J. Hemmings, jun., 5, R. G. Messenger 4. Kanni: L. L. Schulz 3, F. J. Neidick 3. Karte:

A. A. Bierworth 4, D. R. Freeman 4. Ki Ki: O. Blucher 6, R. C. Cooley 0. Kilkerran: F. H. Koch 4. Kelly: J. F. Hannan 5, R. F. Mayfield 4. Koolunga: A. Buchanan 5, J. W. Sykes 0. Koonunga: R. Schulz 5. Koppio: F. G. Gardner 6. Kyancutta: T. A. Holman 5, W. Little 4. Kybybolite: J. M. Wray 5. Laura: E. T. Hollitt 6, H. R. Lines 5. Laura Bay: A. M. Dixon 5, F. Edson 5. Light's Pass: F. W. Boehm 4, F. Boehm 4. Lone Gum and Monash: R. T. Telfer 3, H. March 1. Lyndoch: E. N. Evans 5. MacGillivray: E. C. Seager 5, J. N. Wood 3. Maltee: V. B. Schwarz 5, M. Martin 3. Mangalo: R. J. Turner 3, W. F. Munday 6. Marama: W. S. Gray 4, H. L. Whitford 5. McLaren Flat: G. Dowdell 3, K. Warren 0. Millicent: A. Sapiatzer 5, R. Hateley 5. Miltalie: D. P. Bagnell 4, S. D. Ramsey 3. Minnipa: G. Potts 3, B. C. Black 4. Monarto South: H. A. Hein 6, C. F. Altmann 0. Moorook: L. A. King 4, L. W. King 3. Morchard: A. I. McCallum 0, E. Tilbrook 0. Mount Barker: H. Hunt 2, S. Lucy 2. Mount Bryan: H. H. Edwards 4, A. A. Jeffries 5. Mount Gambier: L. Barrows 5, J. E. Morphett 4. Mount Hope: J. H. Vigar 4, H. H. Myers 5. Mount Pleasant: J. H. Buckley 0, W. K. Johns 3. Mudamuckla: W. J. Reincke 6. A. C. Watson 5. Mundalla: W. F. Golding 6. Murray Bridge: A. Wells 5, B. Kuehel 0. Murraytown: E. B. Pitman 6. Myponga: R. C. West 1, C. A. Martin 0. Nantawarra: S. V. Herbert 5, M. P. Hamdorf 5. Narridy: E. W. Richards 4. Nelshaby: F. Jose 4, H. Williams 4. Nunjikompita: R. Dunn 4, H. J. Salmon 6. O'Loughlin: A. Kloeden 5, C. Bergmann 5. Owen: W. J. Marshman 1, A. N. Freebairn 3. Palabie: R. Mullan 5, D. Swanson 4. Parilla: H. G. Johnston 6, C. S. Foale 5. Parilla Well: P. McInerney 5, L. Ireland 4. Parrakie: A. Afford 4, F. H. Gravestocks 4. Paskeville: H. M. Meier 4, J. Prouse 4. Penola: E. Kidman 2, E. R. Hinze 6. Penwortham: J. R. Hackett 4, A. T. Duke 0. Petina: H. H. Howard 5, W. L. Schultz 5. Pinbong: H. B. Scholz 5, E. M. Scholz 5. Pinkawillinie: W. G. Miller 0, F. T. Freeth 0. Pinnaroo: A. T. Hawthorne 5, C. H. Ross 6. Port Elliott: J. Colebatch 2, W. Bennett 4. Pygery: D. Ingram 5, H. Woodrup 4. Red Hill: J. Dundon 4, L. Harris 5. Rendelsham: F. R. White 4, W. H. Bignell 5. Roberts and Verran: F. Masters 5. Rosedale: C. Mattiske 0, A. Muegge 3. Roseworthy: J. Carmichael 5, E. T. Oates 1. Saddleworth: W. O. Coleman 4, R. E. Miller 3. Shoal Bay: G. Barrett 5, A. G. Nash 4. Snowtown: A. R. Hocking 0. Stockport: F. Watts 3, R. Koch 0. Sutherlands: V. H. Weiss 5, E. Twartz 5. Tantanoola: G. W. Altschwager 4, M. Telfer 5. Taplan: W. J. Hammond 5, P. R. Hodge 0. Taragoro: T. Winters 4, E. M. James 2. Tarlee: N. L. Clarke 0. Tatiara: F. Densley 6, L. H. Butler 6. Ungarra: F. D. Butler 3, W. Gordon 4. Upper Wakefield: C. Roberts 3. Wallala: J. Kinnane 0, S. Morgan 5. Wandearah: E. Sinclair 0, A. Jacobs 4. Warcowie: F. L. Williams 3, B. E. Telfer 5. Warramboo: H. F. Chilman 4, O. J. Murphy 5. Wasleys: O. A. Benger 5, V. W. Day 3. Watervale: J. W. Baillie 5, W. Hamp 6. Weavers: E. H. Giles 5, H. W. Cornish 3. Wepowie: M. J. Gregurke 3, J. F. Burns 6. Whitwarta: J. P. Hoepner 4, F. J. Collins 2. Willowie: R. A. Barrie 4, R. I. Crisp 5. Wilmington: P. C. Cole 3, D. McGhee 6. Wirrabara: A. B. Curtis 5, H. C. Jaeschke 0. Wirrilla: R. F. Kelly 4, A. L. Sandow 0. Wolseley: D. G. Butler 5, W. J. Snoad 6. Wudinna: C. A. Newbon 4, W. P. Bartley 6. Yeelanna: R. R. Wilson 5, G. G. Pearson 2. Yundi: W. Sykes 4, W. Hedger 4. Yurgo: E. A. Easton 4, L. S. Hopgood 5.

OPENING ADDRESS.

In the course of the opening address His Excellency said that he was pleased to see so many smiling faces, which showed him that a wave of optimism had set in and that they were looking forward to the future with a greater measure of hope than in the past. "Before I came to South Australia," said the Governor, "I was not an agriculturalist. To-night I can say that I am. I have taken the

greatest interest in the agricultural life of the State, and I have found to my grea pleasure that there is no portion of the community that can be relied upon t produce greater happiness than the agriculturalists."

The Governor referred with pleasure to the recent beneficial rains that had falle in South Australia.

Round the Corner.

"Nobody can fail to be impressed with the fact that we are really round th corner as far as prosperity is concerned" he said. "Some people will say tha there is no hope—you will always find that kind. But we should do away wit those ideas; we should put behind us the days of depression, and look forwar to the future with greater hope, and remember what the pioneers did, despite th dark days of the past.

"Do not take much notice of pessimists. I want to ask you to look forward t the future with that spirit of hope that sent forward our pioneers towards pros perity and the improvement of our State. I hope that in another year's time will see you smiling even more broadly."

Bulwark of State.

In reply to a vote of thanks, moved by Mr. J. Wallace Sandford, and seconde by Mr. S. Shepherd, the Governor said, cheerfully: "I would ask you not to tak too much notice of all you hear about me. I know I have a reputation for som things, but whatever it is, I am heart and soul in favour of the people in th country, and regard them as the principal bulwark on which the State rests."

THE MINISTER'S ADDRESS.

The Hon. A. P. Blesing, M.L.C. (Minister of Agriculture), in addressing th assembly, congratulated the organisation on its 46th Congress, which repre sented 337 Branches, including 52 Women's Branches, and an aggregate of nearl 7,000 members.

The Agricultural Bureau system had a very firm grip on the producing interest of the State, both from the standpoint of the technique of production and fron that of social intercourse; in the latter direction the Women's Branches, whicl were increasing very rapidly, had much to commend them.

From the technical standpoint the Country Branches of the Bureau represente so many links between producers and the officers of the Department of Agricul ture, and between them had contributed much to the progress and development o South Australian farming.

On the whole, the season appeared to be promising for the State; it wa regrettable that this could not be said of every district. Unfortunately, th prospects of the Upper North and North-Eastern Mallee farms were far from good in particular, those situated outside Goyder's line of rainfall.

In this connection, Government would probably have to consider in the nea future the problem of those Hundreds that in the past 20 years had not average more than 5bush. or 6bush. per acre. It did not seem possible that such farm should be able to pay their way even with the doubtful assistance of side lines. I would be very much better for all concerned if such doubtful wheat holdings coul be gradually converted into sheep farms—not sheep stations.

The Wheat Position.

For the past seven years mean prices realised for wheat had given considerable concern and compelled the Commonwealth Government to come repeatedly to the rescue of farmers, and, unfortunately, over the majority of these seasons, weather conditions had not been favourable. It was, however, permissible to-day to sound a more optimistic note. It could, in fact, be said that from the statistical stand-point the position had never been better since the 1927-1928 season, when the average price realised for wheat in South Australia was 5s. 5¼d. per bushel at seaports

The main cause of the seven-year slump in prices was the heavy carry-over of stocks of exportable wheats from one season to another and this accumulation of stocks had in the main been attributable to increased production both in normally exporting countries and in normally importing countries, on the one hand, and to the apparent reduced demand in many countries that had previously been heavy consumers of wheat, on the other.

Fortunately, the carry-over on 1st August, 1935, was the lowest recorded since 1927-28, namely, approximately 310 million bushels, as against 598 million bushels in 1933-1934 and 625 million bushels (a record) in 1932-1933. These reductions were in the main due to the successive misfortunes of the United States of America farmers, but also to reduced production in most other countries.

In addition, United States of America 1935 crops were again reported to be below normal; nor were crops of other producing countries as good as of recent years.

The price of wheat had already begun to rise, and should continue to do so unless unforeseen world conditions supervened.

Milling Qualities of Wheat.

Much had been said of recent years as to the decline in quality of Australian wheats, and steps had been taken in South Australia to counteract it. A committee had been appointed to deal with the whole question. On this committee were represented:—

1. The Wheat Merchants,
2. The Millers,
3. The Bakers,
4. The Department of Chemistry,
5. The Waite Research Institute,
6. The Roseworthy Agricultural College, and
7. The Department of Agriculture.

One of the first steps the committee had taken was to urge that the following wheat varieties should no longer be grown in South Australia:—

1. Free Gallipoli.
2. Gluclub.
3. Ghurka.
4. Waratah.

It was hoped that farmers would take note of this urgent request, as in all probability wheat buyers would dock those wheats heavily in the 1936-1937 season.

The Agricultural College and the Waite Institute were doing good work in studying the problem of producing new varieties suitable to various districts, which would be satisfactory from the standpoints of yields per acre, quality of flour, and resistance to disease. Officers of the Department of Agriculture would assist in extending the use of any good wheats that might be bred.

It was well known that Parliament passed last year the Noxious Insects Act, 1934, to deal with the control of migrating grasshoppers. The Act placed the responsibility of dealing with this pest upon the district councils, and through them upon individual landowners. The Government had appointed a special committee to study the matter, and it would continue its work in years when the agricultural areas were free from the pest. This committee would, at all times, assist councils and landholders with advice. The Government recognised that in extreme cases it might have to step in with temporary financial assistance, but it expected the councils to take up the work themselves in the first instance. Some very good work was done by several councils last year.

Parliament also passed last year the Dairy Produce Act, 1934, which had rendered possible a home price for butter and cheese in South Australia. This

had meant, as shown by the Dairy Produce Board, that cream suppliers had benefited to the extent of 3½d. per lb. of butterfat in comparison with normal London parity values obtaining over the six months ending on the 30th June, 1934. Makers of farm butter whose butter was of satisfactory quality had also benefited from the higher prices for butter which had ruled on South Australian markets.

THE CHAIRMAN'S ANNUAL REPORT.

The Hon. A. L. McEwin (Chairman) read the following report:—

"It is my privilege to give to this Congress a report on some of the activities of the Advisory Board of Agriculture during the past 12 months. In the course of a year's work the Board has occasion to deal with a very lengthy and a much-varied list of items submitted to it by Conferences and Branches. Many of these items are of purely local application; some of them have national aspirations and others apply to the State as a whole. Careful consideration is given to all, and they are dealt with in the light of the experience of our members who represent important rural industries.

There has not been any change in the personnel of the Board since we met in 1934. On 30th June last the number of Branches was 337, with a total membership of 7,000, which is regarded as a satisfactory roll, and it is pleasing to report that in some districts there has been renewed activity in Bureau work, attended by increased membership in many instances and the consequent better roll-calls at meetings.

We welcome Mr. Shepherd back to the work of the Board after his trip overseas. Mr. Shepherd has given us some valuable information on the agricultural conditions as he found them in the countries he visited, and Branches in the South-East have been particularly fortunate in having the opportunity of hearing his addresses. We desire, too, to extend congratulations to Mr. Shepherd upon receiving the distinction of Life Membership of the Bureau for the very valuable work he has done for the organisation over a period of 22 years.

In order to ascertain the extent of agricultural progress in those parts of the Southern Hemisphere with which we are competing and to inquire into the possibility of applying their methods to our conditions, the Board made a strong recommendation that Mr. W. J. Spafford, Deputy Director of Agriculture, should visit these countries. Mr. Spafford has completed the tour, and the Board shares the confidence of the farming community that the result of this tour will be of immeasurable benefit to the State. The first instalment of Mr. Spafford's report will appear in the September issue of the *Journal*, and it will no doubt be closely read and studied by all who are in any way interested in the progress of our agricultural practices.

At the Blyth Conference in March last Mr. R. H. Eime read a paper on the "Management and Care of the Farm Team." Upon reading this article in the *Journal* His Excellency the Governor commended Mr. Eime on the thoughtful paper he had prepared and asked him to follow it with another on the "Care of Harness." We congratulate Mr. Eime most sincerely for the distinction which His Excellency has thus bestowed upon him and the paper on the "Care of Harness" has been accepted for the Agenda of this Congress.

In order to meet the repeated requests for advice on wool-classing the South Australian School of Mines has made the services of Mr. Goddard available for demonstrations and lectures for several months during the year. These demonstrations have been very popular, and it is hoped that the arrangement will be continued so that every Branch throughout the State will eventually be visited.

While we are aware that the Minister is fully sympathetic towards the extension of instructional work in veterinary hygiene, it is regretted that we have so far not been successful in obtaining the assistance which Bureaux have sought

in the proposed appointment of Veterinary Officers to country districts. We appreciate, however, the establishment of Veterinary Scholarships through which suitable young men are assisted in obtaining their degree in Veterinary Science in the Sydney University. It is hoped that the scheme will be extended so that we may eventually have some guarantee that a qualified veterinarian will be forthcoming each year, and that we will have the benefit of his services in parts of the State where they are most needed. In the meantime, support is being given to the establishment of Veterinary Lodges, which are serving a most useful purpose in many districts.

It will be noted that the Government introduced a Bill during the present Parliamentary Session to bring about the registration of Veterinary Surgeons, and this Bill is at present before the House.

Many discussions have taken place on the important question of improving the milling qualities of wheats. The Millers' Produce Company is giving valuable assistance in this matter by donating a special prize in each District Competition for the highest points secured by crops consisting of varieties other than certain excepted wheats. It is expected by this means to bring greater concentration on the necessity for improving the State's standard of quality.

During the year the Board was asked to express its opinion on a resolution of the New South Wales Farmers' and Settlers' Association, that all wheat bags manufactured in Australia be of the Chapman standard. It was agreed that the standard should be enforced, and a suggestion was made that a bag of wheat, conforming to the standard size, should be accepted for handling irrespective of the total weight.

On several occasions the Board communicated with manufacturers in respect to the price of superphosphate, and it is gratifying to note that there has been a substantial reduction in the price of this commodity.

In view of the large amount of money spent on the reclaimed areas of the Murray Swamps, and of the comparatively small returns, the Board is endeavouring to obtain the full-time services of an Agricultural Adviser to that district.

Questions relating to the Branding of Sheep were brought before the Kyancutta Conference. An opportunity has now been taken to give the fullest information on the provisions of the new Brands Act.

Special attention has recently been drawn to the extensive damage done by Skeleton Weed to wheat-growing lands in New South Wales. It is fortunate, however, that the weed has not made its appearance in this State. The Board has arranged for an article on this weed, by Mr. G. H. Clarke, to be published in the September issue of the *Journal*, in order that farmers will have some means of identifying it in case it shows up here. Members of Branches should be in constant watch for this weed, and as a precaution they should forward a specimen of any unknown plants to the General Secretary for identification.

On various occasions the Board has given its support to the establishment of a Pig Condemnation Fund, and we have been informed by the Minister that the matter would again receive the consideration of Cabinet.

The Dairy Cattle Compensation Fund recommended by the Mount Barker Conference is still under consideration. It is proposed to give attention to the possibility of securing the co-operation of other organisations in this matter.

The Board gave its support to the Mount Barker Conference resolution asking that for the protection of the Dairying Industry, action should be taken to enforce a levy on all butter substitutes manufactured in competition with the dairy butter. At a Conference held at Canberra it was recommended that margarine and margarine-like substances made from imported oil be marketed in white colour, and if

this was adopted it was not proposed to impose a duty on margarine. The Minister has intimated that consideration would be given to the introduction of legislation to deal with the matter.

In replying to a request from the Upper North Conference that farmers be allowed to co-operate in transporting livestock to the Metropolitan Abattoirs, the Transport Control Board intimated that with a view to assisting primary producers, special permits were readily issued for the carriage of lambs, pigs, and calves over controlled routes.

In regard to the Sales Tax on oils used for agricultural machinery, the Prime Minister informed the Premier that the Board's request had been listed for the consideration of the Federal Government when in a position to grant any sales tax remissions. It will be noted that this matter will be again brought before this Congress on Wednesday morning.

Special attention has been given by the Government to the Board's request for better water reticulation on Eyre's Peninsula. The main Departmental difficulty is the question of supply, and steps are being taken to increase the catchment, after which it is anticipated that there will be an extension of service.

The articles by Mr. George Quinn on the results of the Blackwood Experimental Orchard are of special interest to fruit-growers. Various Conferences had requested that the results of this Orchard be made known for the benefit of growers, and the articles which are now being published in the *Journal* are characteristic of Mr. Quinn's thoroughness and will no doubt prove of great value to the fruit industry.

Further attention has been given to the question of cause and control of Gummosis and a request has been made for continued investigations by the Waite Institute in co-operation with the Department of Agriculture.

In response to a resolution of the Fruit Conference held at Balhannah the Chief Horticultural Instructor has intimated that he will explore the possibilities of establishing a demonstrational plot with the object of conducting experiments in ploughing of orchards.

Many other items submitted by Branches either through Congress, Conferences, or meetings have been before the Board and brought under the notice of responsible authorities for attention.

The Pruning Competitions continue to be well patronised by Branches. These Competitions are held along the River Murray, in the Lower North, and in the McLaren Flat district. The Branches in these areas have been particularly fortunate in obtaining the continued support of the Royal Agricultural Society, the Dried Fruits Association, and of Mr. W. Langdon Parsons. The encouragement given by these donors of trophies certainly stimulates the Competitions, which are recognised as having a decided influence on the pruning practices applying to the districts concerned.

Following the praiseworthy efforts of the Light's Pass and Angaston Branches of a few seasons ago in experimenting with methods of combating frosts it is noteworthy that further work in this connection has been done by the Waikerie Branch. It is reported that through the organised effort on the part of members, a recent frost was successfully avoided, and the methods adopted could no doubt be applied with benefit in other districts where frosts are a menace to growers.

The interest in the work of Women's Branches throughout the year has been little short of phenomenal. The first Women's Branch was formed at Riverton in 1917, but there did not appear to be a desire on the part of any other district to join this movement until three years later, when the second Branch was formed

at Saddleworth. Very few additional Branches were established until 1929, when the organisation became more popular among country women, and we find that to-day there are 52 Branches, and with only one exception they are active and are generally living up to the ideals upon which the Bureau was originally founded. An outstanding feature of the work of Women's Branches is the effect they have on the work of Men's Branches. Definite improvement in attendances at Men's Branches has been noticed in most instances where there are corresponding Women's Branches. The practice adopted in several districts of having meetings of both Branches at the same time has had a marked influence on the Men's Branches, and especially is this the case where a social evening follows the business meetings.

A glance at the Agenda for the Women's Congress will give an indication of the extent to which we call upon outside sources to assist in providing papers and demonstrations on subjects in which country womenfolk are particularly interested. The Board extends its sincerest thanks to all who are assisting in this way. On many occasions during the year Women's Branches have again been ably assisted —through the courtesy of the Director of Education—by Miss Campbell, who has attended meetings and Conferences and has given Wireless Talks on the general activities of the Bureau in districts where Women's Branches exist. These talks are an innovation suggested by the 1934 Women's Congress and will undoubtedly be the means of stimulating the work of the Bureau in many ways.

As there is a large assemblage of members here to-night it is an opportune moment to express publicly the Board's appreciation of the work of Branch Secretaries. As a general rule, the secretary is the main executive officer of the local Bureau, and the successful working of his Branch largely depends upon the attitude he adopts towards the office which he holds. We are justified in claiming that our organisation has been successful, and that it has had a marked influence on our agricultural practices. Similarly, we are justified in affirming that much of the credit for this is due to the work of our Secretaries. Their work is of an honorary nature; they have many duties to perform, some of which are arduous, some pleasant, and some may, at times, be irksome. They take the good with the bad with the one object of showing results which will be of use to their fellow-members. It is our duty, therefore, to give public recognition of their services, and to thank them for the manner in which they are assisting the organisation throughout the State.

The Board has had the fullest co-operation of the Department of Agriculture, and we appreciate very highly the assistance which the officers of the Department have given to Branches in particular. These officers are always prepared, wherever possible, to attend meetings, to give addresses or demonstrations, to attend field days and to keep in close touch with Branch members. Very often their work involves personal inconvenience, to which they are prepared to submit for the successful performance of their duty and for the welfare of the farming community. They take an active interest in competitions organised by Branches, their advice is eagerly sought, and the Board is convinced that there is to-day a strong mutual co-operation between Bureau members and Departmental officers generally."

Monday evening's session concluded with an address, illustrated with lantern views, "The Coral Islands of the Great Barrier Reef," by Mr. C. G. Lewis, A.C.U.A., secretary to the Director of Education.

Tuesday, 17th September.

On Tuesday morning Mr. C. E. Verco (Mount Compass) read a paper, "Dairying," and Mr. R. C. Pocock (Lameroo) dealt with the subject of "Pigs and their Management."

Tuesday Afternoon.

The following papers were read:—"The Care of Farm Harness" Mr. R. H. Eime (Blyth); "Some Further Results of Pasture Work at Kybybolite," Mr. L. J. Cook (Manager Kybybolite Experimental Farm); "The Branding of Livestock," Mr. O. H. Laurenti, Registrar of Brands (Stock and Brands Department). At the special session held for Branches in the Fruitgrowing Districts, Mr. A. G. Strickland, M.Sc. (Chief Horticultural Instructor) delivered an address, illustrated with lantern slides, and Mr. R. Cramond, of the Lenswood Branch, read a paper, "What can we do to Aid the Distribution of Fruit in our own State?"

An address, illustrated with lantern views, was given by Mr. W. J. Spafford (Deputy Director of Agriculture) on his tour of the Southern Hemisphere, on Tuesday evening.

Wednesday, 18th September.

Wednesday morning was devoted to Free Parliament, and the following resolutions were carried:—

Moved by Mr. T. Hewland (Adelaide), seconded by Mr. J. Hudd (Adelaide): "That this Congress applauds the quota and equalization plans applying to butter and cheese and that the delegates here assembled urge Parliament to re-enact without delay the Dairy Produce Act of 1934 with the amendments thereto asked for by the South Australian Dairymen's Association."

Moved by Mr. J. Vigar (Mount Hope), seconded by Mr. H. Howard (Petina): "That it be a recommendation from this Congress to all Branches of the Bureau that the May meeting of each year be devoted to a discussion on 'Tree Culture.'"

Moved by by H. B. Scholz (Pinbong) seconded by Mr. T. Roenfeldt (Greenock): "That this Congress urges landholders to plant shade trees on farms and stations and that district councils be asked to conserve and plant trees in the territory under their control."

Moved by Mr. A. Pengilly (Alawoona), seconded by Mr. T. Winters (Taragoro): "That the Farmers Assistance Board be approached to increase to applicants under the Board the petty cash allowance of £12 to £24, the same to be paid in two payments as at present."

Moved by Mr. B. C. Black (Minnipa), seconded by Mr. G. Potts (Minnipa): (*a*) "That the Sales Tax on all agricultural oils used on the farm be removed. (*b*) "That the Sales Tax on lubricating oil used for power in primary production be abolished as has previously been asked for."

Moved by Mr. B. C. Black (Minnipa) seconded by Mr. F. Masters (Roberts and Verran): "That the Government be asked at the termination of the present share-farming agreement to convert the Minnipa Government Farm into a seed wheat and stud farm for the purpose of providing seed wheat to farmers at a reasonable cost."

Moved by Mr. T. Holman (Kyancutta) seconded by Mr. G. Potts (Minnipa): "That this Congress ask the Government to assess water rates on a more equitable system."

Moved by Mr. F. Masters (Roberts and Verran) seconded by Mr. R. Mayfield (Kelly): "That all revenue raised by the Government for motor taxation be used for construction and maintenance of roads."

Moved by Mr. J. Wray (Kybybolite), seconded by Mr. A. Nash (Shoal Bay): "That motions brought before District Conferences should be carried by the majority of delegates present before being passed on to the Advisory Board."

Moved by Mr. F. Masters (Roberts and Verran), seconded by Mr. R. Mayfield (Kelly): "That the subsidy under the bull tax be increased by the Government paying the cost of the transport of the animal, in order to give greater benefit to its contributors."

Moved by Mr. R. Mayfield (Kelly), seconded by Mr. J. Hannan (Kelly): "That this Congress strongly resists any efforts to lower the registration fee of Alsatian dogs."

Moved by Mr. R. Mayfield (Kelly), second by Mr. J. Hannan (Kelly): "That the Government be asked to take immediate steps to make the dehorning of bulls compulsory."

Moved by Mr. D. Ingram (Pygery), seconded by Mr. F. Densley (Tatiara): "That veterinary officers be appointed to inspect stallions on Eyre's Peninsula for Government certificate of soundness the same as is done in other parts of the State."

Moved by Mr. W. J. Hemmings (Kalangadoo), second by Mr. R. Messenger (Kalangadoo): "That Congress urge the Federal Government to remove the duty from imported wire-netting or substantially reduce same."

Moved by Mr. D. Butler (Wolseley), seconded by Mr. W. Snead (Wolseley): "That the Government be urged to introduce legislation this session enabling a bulk-handling system to be installed in South Australia."

Moved by Mr. H. Scheer (Frayville), seconded by Mr. T. Roenfeldt (Greenock): "That bounties (if any) be distributed as last year, on acreage and bushel basis."

Moved by Mr. D. Butler (Wolseley), seconded by Mr. W. Snead (Wolseley): "That the Government be urged to see that the administration of the Noxious Weeds Act be made more effective, particularly in relation to Bathurst burr."

Moved by Mr. J. Colebatch (Port Elliot), seconded by Mr. W. Bennett): "That the Advisory Board be recommended to request the combined Governments of the Commonwealth to unite in an endeavour to publish a 'Noxious Weeds Reference Book' for the use of the Education Departments in all States of the Commonwealth and that every Branch of the Agricultural Bureau be asked to foster the use of the books in schools."

Moved by Mr. R. Miller (Saddleworth), seconded by Mr. W. Coleman (Saddleworth): "That Congress requests the Advisory Board to approach stock agents as a body and ask them to review their charges at country markets."

Moved by Mr. D. Noble (Arthurton), seconded by Mr. J. Prouse (Paskeville): (*a*) "That the Fire Act be amended making it possible for one man to do fire harrowing"; (*b*) "That Congress request an amendment of the law affecting fire raking making it possible for one man to do fire raking of stubble without the consent of a fire controller."

Moved by R. Schulz (Koonunga), seconded by Mr. T. Roenfeldt (Greenock): "That a Congress be held every year."

Moved by Mr. F. Master (Roberts and Verran), seconded by Mr. W. J. Hemmings (Kalangadoo): " That this Congress proposes the abolition of the South Australian butter stabilization scheme."

Moved by Mr. F. Cramond (Lenswood and Forest Range): "That the Education Department be asked to assist in advertising the value of fruit by instructing teachers to give lessons at least once a month on the advantages of fruit in the daily diet."

Resolution Lost.

"That the Dairy Industry Act of 1928 be amended so that payment car be made on the basis of 'Commercial Butter' instead of 'Butterfat.'"

In the evening Dr. A. R. Callaghan, Principal of the Roseworthy Agricultural College, spoke on "Progress in the Improvement of the Baking Quality of South Australian Wheat."

On Thursday morning delegates under the guidance of Dr. A. E. V. Richardson inspected the Waite Agricultural Research Institute.

CODLING MOTH CONTROL EXPERIMENTS, BLACKWOOD, 1934-35.

[R. Fowler, Manager, Blackwood Experimental Orchard.]

During the season 1934-35 one of the worst outbreaks of codling moth ever experienced in this district occurred. In spite of the fact that it was an "off" year as far as apples and pears were concerned the crop was not abnormally light on many trees of the Jonathan and Cleopatra varieties used in the tests. In the 1933-34 season codling moth infestation was comparatively slight, the wastage in the spraying tests ranging from 1.37 per cent. to 2.90 per cent. As all due precautions were taken in the way of cleaning up windfalls, attending to bandages, scraping off rough bark, &c., it seemed safe to assume that the number of over-wintering larvae would be small, but evidently this was not so judging by the numbers of spring brood moths caught in the bait traps.

The summer was cool with very few days when the temperature reached or exceeded 100° Fahr., and though some rain fell in the early summer the latter part of the season was dry. The number of spraying schedules this season was reduced to five, such schedules being replicated. The schedules were designed as in the previous season to test the control value of summer oil sprays, bearing in mind the relative costs of arsenate of lead and oil sprays, and the question of arsenical residue on harvested fruit.

Studies were continued on the following aspects:—

(1) Lures and bait traps, both as a means of reducing the moth population in the orchard, and of determining the best time to apply cover sprays.

(2) Bandages, both chemical and ordinary, for trapping codling moth larvae moving up or down the tree.

Bait Trap and Lure Experiments.

These experiments have been in progress for many years, but still afford useful information. Various types of glass jars and pots have been used, both wide and narrow mouth, and with variable results. From the evidence accumulated during the last three seasons it would seem advisable that to ensure accurate data on the emergence of moths, a ½in. wire netting mesh cover should be placed over any wide-mouthed jars used in order to prevent removal of trapped moths by small birds. Molasses and vinegar were used as lures, the former at the rate of 1 in 16, and the latter 1 in 10. For some years the use of vinegar had been discontinued because in previous tests it had been found much inferior as an attractant, and far more destructive to beneficial insects. The results again confirmed our previous experience.

In this test four rows each containing 12 Cleopatra apple trees were used. In rows 1 and 3, traps were hung in every other tree baited with molasses, every other trap being covered with a wire netting cover. Rows 2 and 4 were treated in the same way, excepting that vinegar was used instead of molasses in the traps. The catch of moths is indicated in Table I.

TABLE I.—*Results of Trials with Molasses and Vinegar as Lures, and with Covered and Uncovered Traps.*

Location of Traps.		5/11/34	12/11/34	19/11/34	26/11/34	3/12/34	10/12/34	17/12/34	24/12/34	31/12/34	7/1/35	14/1/35	21/1/35	28/1/35	4/2/35	11/2/35	18/2/35	25/2/35	4/3/35	11/3/35	18/3/35	Total.
Manure Test, rows 1-3 ...	Covered...	26	5	2	68	46	54	53	23	10	1	32	6	14	4	12	53	88	50	33	1	581 } 752
Molasses, 1-16	Uncovered	11	1	2	8	—	2	8	5	1	1	5	6	8	3	9	25	41	23	12	—	171 }
Manure Test, rows 2-4 ...	Covered...	19	2	2	29	8	1	6	4	—	—	5	2	7	—	1	3	28	24	14	—	155 } 217
Vinegar, 1-10	Uncovered	13	2	4	—	—	—	1	1	—	—	—	—	—	—	—	3	21	11	6	—	62 }
	Totals	69	10	10	105	54	57	68	33	11	2	42	14	29	7	22	84	178	108	65	1	969

Catch with molasses lure, 752; covered traps, 581; uncovered, 171.
Catch with vinegar lure, 217; covered traps, 155; uncovered, 62.

It will be noted that in rows 1 and 3 in which molasses baits were used, the number of moths caught was 752—581 in the covered traps, and 171 in the uncovered. In rows 2 and 4 with vinegar 217 moths were caught—155 in the covered traps, and 62 in the uncovered. The percentage catch per trap with molasses was 62.66, and with vinegar 18.08. The experiment was repeated on a larger scale on a block of 400 trees. Seventy-two deep, fairly wide-mouthed jars were used without covers and were distributed evenly through the block. The catch of moths showed 40.75 per trap with molasses, and 5.7 per jar with vinegar. The vinegar used was pure apple vinegar, as it was thought probable this would prove more attractive to codling moth than either wine or malt vinegar. No records were made of beneficial insects caught, as previous experiments were fairly definite in this respect.

In order to determine emergence periods of moths 42 traps were used in different parts of the orchard. Regular weekly counts were made as to the number of moths trapped, and in most cases, sex determinations. Results are indicated in Table II:—

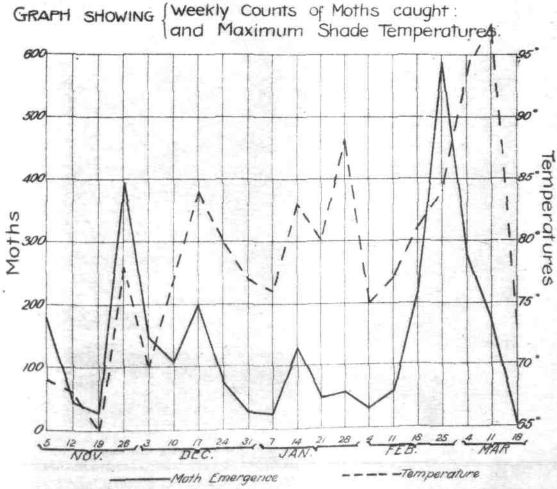
TABLE II.—*Weekly Counts of Codling Moths in Bait Traps, Blackwood,* 1934-35.

Week ending.	Moths Trapped.	Codling Moth Sex Determination.			Remarks.
		Males.	Females.	Total Examined.	
5/11/34	180	79	98	177	
12/11/34	47	16	12	28	
19/11/34	27	20	13	33	
26/11/34	395	170	203	373	
3/12/34	147	66	79	145	Number of traps used, 42.
10/12/34	109	67	42	109	Average catch per trap, 67·19.
17/12/34	200	90	102	192	First moth caught 23rd October, 1934.
24/12/34	75	No exam	ination ma	de	
31/12/34	25	No exam	ination ma	de	Sex determination.
7/1/35	22	No exam	ination ma	de	Moths examined, 2,040; males 838, females 1,202.
14/1/35	130	45	89	134	
21/1/35	48	28	18	46	Percentage males to females.
28/1/35	57	25	21	46	Spring brood, 48·06 to 51·94 per cent.
4/2/35	29	6	78	24	Second brood, 33·57 to 66·43 per cent.
11/2/35	57	15	42	57	
18/2/35	212	62	147	209	
25/2/35	588	No exam	ination ma	de	
4/3/35	297	84	198	282	
11/3/35	172	64	116	180	
18/3/35	5	1	4	5	
	2,822	838	1,202	2,040	

An examination of the figures shows that 2,822 moths were trapped, or an average of approximately 67 per trap. Sex determinations were made of 2,040 moths, and of these 838 were males and 1,202 females. As in previous seasons, catch is noted that the percentage of females to males appears to increase in the

second brood—66.46 to 33.54. These figures are almost in the same ratio as those for the season 1933-34. The first moths were also trapped on the same day each year (23rd October). A comparison of the codling moth infestation in the various plots in trapped and untrapped portions of the orchard reveals that the wastage due to codling moth injury was no greater where traps were not used than where large numbers of moths were caught. This again confirms previous experience, and it would seem therefore that the chief value attachable to the bait traps is the information afforded as to the emergence periods of the moths for the proper timing of cover sprays.

On Graph No. 1 the weekly counts of the numbers of moths trapped are plotted together with mean maximum shade temperatures. Two distinct maximum emergence periods are shown—the first or spring brood reaching a peak on 26th November, and the second brood on 25th February. In comparison with the previous season the spring brood peak emergence was much earlier than in 1933, when it occurred on 11th December. The second brood emergence synchronised almost with that of last year, on 26th February, and late apples were badly infested by this brood even where an extra sixth spray was applied; a very high percentage of stings was recorded in the Granny Smith variety.



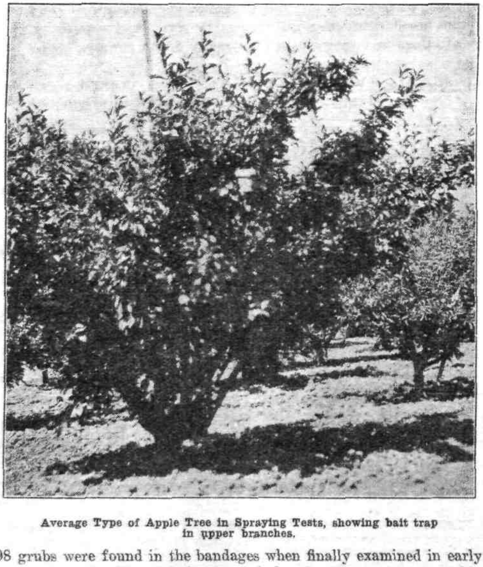
EXPERIMENTS WITH BANDAGES.

Bandages of the ordinary bag type were applied to all the trees in the experimental plots during the second week in December. These bandages were examined at regular weekly intervals until the 1st February, and records made of the number of larvae caught. Table III. indicates the result.

TABLE III.—*Weekly Counts of Codling Moth Larvae Caught in Bandages, Blackwood*, 1934-35.

Date Examined.	No. of Larvae.	Date Examined.	No. of Larvae.	
13/12/34	—	8/2/35	154	
24/12/34	30	15/2/35	194	Total catch from 189
4/1/35	74	22/2/35	177	bandages, 2,011
11/1/35	77	1/3/35	162	Average per bandage,
18/1/35	116	8/3/35	139	10·63
25/1/35	112	15/3/35	162	
1/2/35	116	18/4/35	498	

Two thousand and eleven grubs were caught in 189 bandages, an average of 10.63 per bandage. Odd grubs only were caught during December, but from then onwards the numbers rose, and were fairly consistent till the end of the season.



Average Type of Apple Tree in Spraying Tests, showing bait trap in upper branches.

Only 498 grubs were found in the bandages when finally examined in early winter this year as compared with 1,171 the season before in the same number of bandages on the same trees. These figures in conjunction with those indicating the large numbers of moths caught in the bait traps at the end of the season would seem to indicate that more than the usual number of larvae of the second brood transformed into moths, and therefore fewer grubs were left to overwinter. Chemical bandages were also used on a few mixed varieties of apples in a portion of the orchard not used for spraying tests but sprayed in routine manner with arsenate

of lead. The bandages were put out during the first week in January, 1935, when the catch in the normal bandages indicated that the codling grubs were emerging, so that the toxic properties of the bandage might be conserved as long as possible. An ordinary bag bandage was placed above and below the chemical bandage as in the previous year's experiment. The object was:—

(1) To gain some knowledge of the movements of the codling grubs after leaving the fruit.

(2) To ascertain whether the beta-naphthol in the bandages would repel the grubs in any way.

The bag bandages were examined weekly, and the chemical bandage remained untouched till the end of May. The final figures showed that 337 grubs were caught in the top bandage, 462 in the chemical, and 303 in the bottom bandage. This result confirms last year's experience, and apparently indicates that the majority of grubs do not fall to the ground when they leave the fruit. Many evidently climb about the limbs and down the trunk in search of a hiding place. Since more grubs were caught in the chemical bandages than in either the top or bottom bandage it is evident that the grubs are not repelled by the beta-naphthol. Of the 462 grubs caught in the chemical bandages 75 were found to be alive, though most of them were affected in some way by the chemical, being almost reddish-brown in colour with a dark line along the body. Since apparently this type of bandage loses its toxic property at the end of the season, they should not be left to rot on the tree, but carefully taken off and burnt before the end of May. No injury was noticeable on trees bandaged with this type of bandage for the past three years, but in all cases the trees used had fairly old and rough bark.

SPRAYING EXPERIMENTS.—DISCUSSION OF RESULTS.

All spray schedules have been applied with the object of determining their effectiveness in control of codling moth, and the extent to which they result in arsenical residue on harvested fruit; at the same time attention has been given to costs of the various schedules. All trees in the test plots from which records were taken comprised the Cleopatra variety, with the exception of Plot B1, which consisted of Jonathans. The trees were all fairly well grown, and good average trees for their age. Main plots contained 12 trees each, and the replication from six to eight trees.

Details of spray schedules were as follows:—

Details of Spray Schedules, Blackwood, 1934-35.

Spray No.	Spray Material.	Date of Application.	
	Schedule A.—12 Trees, Cleopatra variety—		
1	*Lead arsenate, 4lbs. to 100gals. water with ½lb. spreader	29/10/34	Calyx spray
2	Lead arsenate, 4lbs. to 100gals. water with ½lb. spreader	14/11/34	1st cover spray
3	Lead arsenate, 3lbs. to 100gals. water with ½lb. spreader	13/12/34	2nd cover spray
4	Lead arsenate, 3lbs. to 100gals. water with ½lb. spreader	15/1/35	3rd cover spray
5	Lead arsenate, 3lbs. to 100gals. water with ½lb. spreader	14/2/35	4th cover spray
	Schedule B.—12 Trees, Cleopatra variety—		
1	Lead arsenate, 4lbs. to 100gals. water with ½lb. spreader	29/10/34	Calyx spray
2	Lead arsenate, 4lbs. to 100gals. water with ½lb. spreader	14/11/34	1st cover spray
3	Lead arsenate, 3lbs. to 100gals. water with ½lb. spreader	13/12/34	2nd cover spray
4	White Oil, 1-60	15/1/35	3rd cover spray

***Details of Spray Schedules, Blackwood,* 1934-35—continued.**

Spray No.	Spray Material.	Date of Application.	
5	White oil, 1-60	14/2/35	4th cover spray
	Schedule B1.—12 Jonathans—		
1	Lead arsenate, 4lbs. to 100gals. water with ½lb. spreader	29/10/34	Calyx spray
2	Lead arsenate, 4lbs. to 100gals. water with ½lb. spreader	14/11/34	1st cover spray
3	White oil, 1-60	13/12/34	2nd cover spray
4	White oil, 1-60	15/1/35	3rd cover spray
5	White oil, 1-60	14/2/35	4th cover spray
	Schedule C.—12 Cleopatra—		
1	Lead arsenate, 4lbs. to 100gals. water with ½lb. spreader	29/10/34	Calyx spray
2	Lead arsenate, 4lbs. to 100gals. water with ½lb. spreader	14/11/34	1st cover spray
3	White oil, 1-60	13/12/34	2nd cover spray
4	Lead arsenate, 3lbs. to 100gals. water with ½lb. spreader	15/1/35	3rd cover spray
5	White oil, 1-60	14/2/35	4th cover spray
	Schedule D.—12 Cleopatra—		
1	Lead arsenate, 4lbs. to 100gals. water with ½lb. spreader	29/10/34	Calyx spray
2	Lead arsenate, 4lbs. to 100gals. water with ½lb. spreader	14/11/34	1st cover spray
3	Lead arsenate, 2lbs. to 100gals. white oil, ¾gal. to 100gals.	13/12/34	2nd cover spray
4	Lead arsenate, 2lbs. to 100gals. white oil, ¾gal. to 100gals.	15/1/35	
5	White oil, ¾gal. to 100gals. Nicotine sulphate 1-1,600 ...	14/2/35	—

* Lead arsenate in powder form used in all Schedules.

Computations of results were made as in past seasons by examination and weighing of all fruit, including windfalls harvested from all the trees in the test. No distinction was made between entrances and stings provided the blemish rendered the fruit unfit for export. A study of the figures from trees carrying comparable crops reveals a considerable tree to tree variation in the wastage due to codling injury under the same spray treatment, *e.g.*, in the case of two lead sprays followed by three oil sprays there was a general average infection of 7.08 per cent., whereas individual tree wastages varied from 3.1 per cent. to 10.17 per cent. Bait traps and bandages were used in the main plots and bandages only in the replication. The calyx spray was applied when the petals had fallen from most of the blossoms, and the first cover spray from 12 to 14 days later. Other sprays were timed to meet the maximum emergence of moths as nearly as possible. The spray was applied with a motor spray pump more in the form of a coarse coverage than a misty spray, and at a pressure of from 175lbs. to 200lbs. using pistol grips fitted with rod and nozzle attachments. Every effort was made to see that the work was thoroughly done at each application. Table IV. sets out the spraying results:—

An examination of the table reveals that quite a fair average control was maintained by all the schedules, considering that it was an off season and the crop of apples was very variable in each test, ranging from a few pounds to an average crop. Schedule B1 applied to Jonathans only, gave the best results as regards wastage (7.08 per cent.), but is not comparable with other schedules applied to Cleopatra only, and is therefore not included in Table IV. In the replicated plot no bait traps were used, and the results again confirm previous experience that reducing the codling moth by trapping does not seem to appreciably reduce the wastage caused by codling injury.

TABLE IV.—*Results of Spraying Tests, Blackwood, 1934-35.*

All Cleopatra Apple Trees.

Sch.	No. of Trees.	Spray Schedule.	Main Plots.					Replication.				
			Clean Fruit, in Lbs.	Codling Fruit, in Lbs	Percentage of Codling by Weight	No. of Moths Caught	No. of Larvae Caught	No. of Trees.	Clean Fruit, in Lbs.	Codling Fruit, in Lbs.	Percentage of Codling by Weight	No. of Larvae Caught
A	12	Lead arsenate five times	837¼	126¾	15·14	385	129	6	884¾	78¾	8·9	317
B	12	Lead arsenate three times, two cover sprays white oil	1,071	137	12·81	142	165	8	805¼	40¼	5·00	131
C	12	Lead arsenate twice, then oil-lead-oil	1,432¾	143¾	10·03	367	173	7	1,234¾	93	7·53	330
D	12	Lead arsenate twice, combined oil and lead twice, combined oil and nicotine sulphate	723¾	69½	9·61	75	89	8	1,898¾	121¾	6·41	452

Half-pound spreader to 100galls. used in all lead sprays.
Bag bandages used on all trees. No bait traps used in replication.

In the main and replicated plots there is really very little significant difference unless it is between A and D, and even between these two plots the difference is no greater than between two trees in the same plot. Control with arsenate of lead alone was slightly less satisfactory this season. This result may possibly be due to the fact that the concentration was reduced from 4lbs. to 3lbs. per 100galls. in the last three cover sprays. In previous experiments the heavier concentration gave better results than the weaker one.

In Plot B1 the three oil sprays had no detrimental effect on the colour or appearance of the Jonathan apples, though they were slightly dusty. On the Cleopatras, however, the use of white oil in Schedules B and C caused considerable injury and loss through oil spotting. In Schedule D the oil was used in combination with the arsenate of lead at the rate of only ⅜gall. to 100galls. of spray, and practically no oil spotting resulted. Under similar conditions to those prevailing at Blackwood white oil sprays alone at a strength of 1gall. in 60galls. in the last two or three cover sprays should be used with extreme caution on the Cleopatra variety.

Arsenical Residues.

One of the main reasons for including white oil sprays in the schedule is the reduction of the arsenical residue to an amount permitted by health authorities. Representative samples from each spray schedule were taken from boxes of fruit in the packing shed and submitted to the Director of Chemistry for analysis, to whom we are indebted for the following report:—

Plot.	Spray Schedule.	Hundredths of a Grain of As_4O per lb.
A	Lead arsenate with spreader five times	·030
B	Lead arsenate three times followed by two oil sprays	·025
B1	Lead arsenate, twice, followed by three oil sprays	·010
C	Lead arsenate, twice, followed by oil, lead, oil	·025
D	Lead arsenate, twice, followed by oil and lead combined twice, and white oil and nicotine sulphate once	·042

In all these schedules the arsenical residue is above the tolerance with the exception of B1, which is just on the limit. Apples from these tests showed visible signs of arsenical residue, and all were treated before shipment overseas by dipping in a washing solution. Washing experiments were conducted with various dipping solutions, and these experiments will be the subject of further report.

Spraying Costs.

Table V. shows the approximate cost of each spray schedule on the basis of 100galls. of spray:—

Table V.

Schedule.	Arsenic Sprays.			Oil Sprays.			Nicotine Sprays.		Spreader.	Total Cost.	Extra Cost over A.
	No. of Sprays	Cost.	Total.	No. of Sprays	Cost.	Total.	No. of Sprays	Cost.			
A	*2	3 2	6 4 } 13 5	—	—	—	—	—	3 9	0 17 2	—
	†3	2 4½	7 1 }								
B	2	3 2	6 4 } 8 8	2	7 6	0 15 0	—	—	2 3	1 5 11	8 9
	1	2 4½	2 4 }								
B1	2	3 2	6 4	3	7 6	1 2 6	—	—	1 6	1 10 4	13 2
C	2	3 2	6 4 } 8 8	2	7 6	0 15 0	—	—	2 3	1 5 11	8 9
	1	2 4	2 4 }								
D	2	3 2	6 4 } 9 6	3	3 4½	0 10 1	1	3 5	1 6	1 4 6	7 4
	‡2	1 7	3 2 }								

* 4lbs. per 100gals. † 3lbs. per 100gals. ‡ 2lbs. per 100gals.

It will be seen that the addition of white oil emulsion sprays added considerably to the costs of materials used, and without very materially increasing the codling control, as shown by the inconsistent results obtained. The total cost column in the above table represents the approximate cost per ½ acre or 50 average sized trees. No attempt has been made to work out a profit and loss table. This is not possible with any degree of accuracy when the crop is light and variable and the significant differences are small.

Summary.

(1) Results of spray schedules were inconsistent, but on the whole gave fairly satisfactory control use.

(2) White oil emulsion sprays gave materially the same control as did arsenate of lead sprays, and when used for the last three covers resulted in less arsenical residue.

(3) White oil emulsion sprays should be used with caution on Cleopatra apples, but appear safe when used on other varieties.

(4) Molasses as a lure proved more effective than apple vinegar.

(5) Covered traps should be used to prevent birds interfering with records of moths trapped.

(6) Reducing the moth population in the orchard by trapping does not seem to reduce the wastage due to codlin injury.

(7) Chemical bandages are effective traps for codling larvae.

My thanks are due to Mr. C. Pollitt for assistance rendered in the preparation of this report in checking data and plotting of graph.

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FERTILISERS ACT, 1918—ANALYSES OF FERTILISERS.

In half-yearly periods to June and December, 1934, and June, 1935.

Results of analyses obtained by the Government Agricultural Analyst from samples procured by Inspectors of Fertilisers during the six months ended 30/6/34.

NOTE.—*Deficiencies greater than permitted under Section 12 of the Act are shown in bold type.*

Sample No.	Name of Firm and Fertiliser.	Phosphate. Water Soluble. Vendor's Guarantee.	Phosphate. Water Soluble. Result of Analysis.	Phosphate. Citrate Soluble. Vendor's Guarantee.	Phosphate. Citrate Soluble. Result of Analysis.	Phosphate. Acid Soluble. Vendor's Guarantee.	Phosphate. Acid Soluble. Result of Analysis.	Phosphate. Total. Vendor's Guarantee.	Phosphate. Total. Result of Analysis.	Nitrogen. Vendor's Guarantee.	Nitrogen. Result of Analysis.	Nitrogen as Nitrates. Vendor's Guarantee.	Nitrogen as Nitrates. Result of Analysis.
		%	%	%	%	%	%	%	%	%	%	%	%
	Adelaide Chemical and Fertilizer Co., Ltd.—												
2432	Blood Manure	—	—	—	—	—	—	—	—	13·0	13·8	—	—
2286	Blood Manure	—	—	—	—	—	—	—	—	13·0	14·3	—	—
2425	Bone and Super	21·0	24·0	10·0	11·2	12·0	16·2	43·0	51·4	1·6	2·0	—	—
2287	Bone and Super	21·0	20·9	10·0	14·1	12·0	13·5	43·0	48·5	1·6	2·0	—	—
2282	Bone Dust	—	—	—	—	40·0	41·9	40·0	41·9	3·5	3·7	—	—
2431	Bone Dust	—	—	—	—	40·0	46·4	40·0	46·4	3·25	4·2	—	—
2422	48% Mineral Super	48·0	47·6	—	—	—	—	48·0	47·6	—	—	—	—
2285	48% Mineral Super	48·0	48·2	—	—	—	—	48·0	48·2	—	—	—	—
2423	Top Special Super	45·0	46·6	—	—	—	—	45·0	46·6	—	—	—	—
2284	Top Special Super	45·0	45·6	—	—	—	—	45·0	45·6	—	—	—	—
2430	Top Special Super	45·0	45·4	—	—	—	—	45·0	45·4	—	—	—	—
	Barrett, B. A.—												
2434	Carbonate Mixture	—	—	—	—	—	—	—	—	1·25	1·28	—	—
	Chester Chemical Products—												
2283	Filtered Soil	—	—	—	—	—	—	—	—	2·13	4·55	—	—
	Cresco Fertilizers Limited—												
2421	45 Super	45·0	46·5	—	—	—	—	45·0	46·5	—	—	—	—
2429	45 Super	45·0	44·3	—	—	—	—	45·0	44·3	—	—	—	—
2296	45 Super	45·0	44·5	—	—	—	—	45·0	44·5	—	—	—	—
2436	45 Super	45·0	47·2	—	—	—	—	45·0	47·2	—	—	—	—
2440	45 Super	45·0	47·2	—	—	—	—	45·0	47·2	—	—	—	—
2427	48 Super	48·0	47·6	—	—	—	—	48·0	47·6	—	—	—	—
2428	Super. and Ammonia, 2 and 1	30·0	29·1	1·0	1·9	1·0	1·0	32·0	32·0	6·87	7·6	—	—
	Government Produce Department—												
2289	Blood Manure	—	—	—	—	—	—	—	—	13·0	13·2	—	—
2288	Bone Manure	—	—	—	—	25·0	30·2	25·0	30·2	7·0	6·53	—	—
	Hoffmann, H. W.—												
2426	Para Bone Manure	—	—	—	—	40·0	51·4	40·0	51·4	3·5	4·2	—	—

ANALYSES OF FERTILISERS—*continued.*

Sample No.	Name of Firm and Fertiliser.	Potash in Water Soluble Form.		Calcium Oxide, CaO.		Calcium Oxide Expressed as Calcium Sulphate, $CaSO_4$.		Bone Manure, Fine Material.		Agricultural Lime, Fine Material.		Gypsum, Fine Material.		Phosphate Fertiliser, Fine Material.		Moisture.
		Vendor's Guarantee.	Result of Analysis.	Vendor's Guarantee.	Result of Analysis.	Vendor's Guarantee.	Result of Analysis.	Vendor's Guarantee.	Result of Analysis.	Vendor's Guarantee.	Result of Analysis.	Vendor's Guarantee.	Result of Analysis.	Vendor's Guarantee.	Result of Analysis.	
		%	%	%	%	%	%	%	%	%	%	%	%	%	%	%
	Adelaide Chemical and Fertilizer Co., Ltd.—															
2432	Blood Manure	—	—	—	—	—	—	—	—	—	—	—	—	—	—	10·4
2286	Blood Manure	—	—	—	—	—	—	—	—	—	—	—	—	—	—	6·18
2425	Bone and Super.	—	—	—	—	—	—	60·0	60·0	—	—	—	—	—	—	4·00
2287	Bone and Super.	—	—	—	—	—	—	60·0	63·0	—	—	—	—	—	—	8·17
2282	Bone Dust	—	—	—	—	—	—	50·0	57·0	—	—	—	—	—	—	6·6
2431	Bone Dust	—	—	—	—	—	—	50·0	40·0	—	—	—	—	—	—	5·6
2422	48% Mineral Super.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	9·7
2285	48% Mineral Super.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	8·67
2423	Top Special Super.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	7·9
2284	Top Special Super	—	—	—	—	—	—	—	—	—	—	—	—	—	—	8·9
2430	Top Special Super.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	6·9
	Barrett, B. A.—															
2434	Carbonate Mixture	—	—	40·0	44·3	—	—	—	—	80·0	94·5	—	—	—	—	1·9
	Chester Chemical Products—															
2283	*Filtered Soil*	0·6	0·22	—	—	—	—	—	—	—	—	—	—	—	—	3·5
	Cresco Fertilizers Limited—															
2421	45 Super.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	6·8
2429	45 Super.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	5·1
2296	45 Super.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	7·37
2436	45 Super.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	6·9
2440	45 Super.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	6·0
2427	48 Super.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	7·5
2428	Super. and Ammonia, 2 and 1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	3·2
	Government Produce Department—															
2289	Blood Manure	—	—	—	—	—	—	—	—	—	—	—	—	—	—	9·43
2288	Bone Manure	—	—	—	—	—	—	75·0	75·0	—	—	—	—	—	—	5·24
	Hoffmann, H. V.—															
2426	Para Bone Manure	—	—	—	—	—	—	40·0	66·5	—	—	—	—	—	—	7·0

ANALYSES OF FERTILISERS—*continued.*

Sample No.	Name of Firm and Fertiliser.	Phosphate. Water Soluble. Vendor's Guarantee.	Phosphate. Water Soluble. Result of Analysis.	Phosphate. Citrate Soluble. Vendor's Guarantee.	Phosphate. Citrate Soluble. Result of Analysis.	Phosphate. Acid Soluble. Vendor's Guarantee.	Phosphate. Acid Soluble. Result of Analysis.	Phosphate. Total. Vendor's Guarantee.	Phosphate. Total. Result of Analysis.	Nitrogen. Vendor's Guarantee.	Nitrogen. Result of Analysis.	Nitrogen as Nitrates. Vendor's Guarantee.	Nitrogen as Nitrates. Result of Analysis.
		%	%	%	%	%	%	%	%	%	%	%	%
	Metropolitan Abattoirs Board—												
2279	M.A.B. Blood Manure	—	—	—	—	—	—	—	—	13·0	13·7	—	—
2280	M.A.B. No. 1 Bone Manure	—	—	—	—	25·0	26·2	25·0	26·2	7·5	7·1	—	—
2281	M.A.B. No. 2 Bone Manure	—	—	—	—	25·0	30·0	25·0	30·0	4·5	6·1	—	—
	Shell Fertilizers Limited—												
2278	Ground Oyster Shell	—	—	—	—	—	—	—	—	—	—	—	—
	S.A. Gas Company—												
2424	Sulphate of Ammonia	—	—	—	—	—	—	—	—	20·0	20·9	—	—
2276	Sulphate of Ammonia (neutral)	—	—	—	—	—	—	—	—	20·0	21·3	—	—
2277	Sulphate of Ammonia	—	—	—	—	—	—	—	—	20·0	20·6	—	—
	Wallaroo-Mt. Lyell Fertilisers, Ltd.—												
2295	Bone Dust	—	—	—	—	40·0	45·4	40·0	45·4	3·25	3·5	—	—
2291	W.M.L. Granular High Grade Super.	45·0	45·8	—	—	—	—	45·0	45·8	—	—	—	—
2292	W.M.L. High Grade Super.	45·0	44·0	—	—	—	—	45·0	44·0	—	—	—	—
2433	W.M.L. High Grade Super.	45·0	50·0	—	—	—	—	45·0	50·0	—	—	—	—
2437	W.M.L. High Grade Super.	45·0	46·0	—	—	—	—	45·0	46·0	—	—	—	—
2439	W.M.L. High Grade Super.	45·0	48·0	—	—	—	—	45·0	48·0	—	—	—	—
2438	W.M.L. 48% Super.	48·0	48·2	—	—	—	—	48·0	48·2	—	—	—	—
2293	Sulphate of Ammonia	—	—	—	—	—	—	—	—	20·0	21·1	—	—
2294	2 : 1 Super and Ammonia No. 3	30·0	31·2	1·0	3·0	1·0	0·7	32·0	34·9	6·87	7·25	—	—
	Webb, A. J.—												
2435	Carbonate of Lime	—	—	—	—	—	—	—	—	—	—	—	—

ANALYSES OF FERTILISERS—*continued*.

Sample No.	Name of Firm and Fertiliser.	Potash in Water Soluble Form. Vendor's Guarantee.	Potash in Water Soluble Form. Result of Analysis.	Calcium Oxide, CaO. Vendor's Guarantee.	Calcium Oxide, CaO. Result of Analysis.	Calcium Oxide Expressed as Calcium Sulphate, CaSO4. Vendor's Guarantee.	Calcium Oxide Expressed as Calcium Sulphate, CaSO4. Result of Analysis.	Bone Manure, Fine Material. Vendor's Guarantee.	Bone Manure, Fine Material. Result of Analysis.	Agricultural Lime, Fine Material. Vendor's Guarantee.	Agricultural Lime, Fine Material. Result of Analysis.	Gypsum, Fine Material. Vendor's Guarantee.	Gypsum, Fine Material. Result of Analysis.	Phosphate Fertiliser, Fine Material. Vendor's Guarantee.	Phosphate Fertiliser, Fine Material. Result of Analysis.	Moisture.
		%	%	%	%	%	%	%	%	%	%	%	%	%	%	%
	Metropolitan Abattoirs Board—															
2279	M.A.B. Blood Manure	—	—	—	—	—	—	—	—	—	—	—	—	—	—	7·0
2280	M.A.B. No. 1 Bone Manure	—	—	—	—	—	—	50·0	52·0	—	—	—	—	—	—	9·9
2281	M.A.B. No. 2 Bone Manure	—	—	—	—	—	—	55·0	71·0	—	—	—	—	—	—	5·8
	Shell Fertilizers Limited—															
2278	Ground Oyster Shell	—	—	30·0	36·2	—	—	—	—	80·0	77·5	—	—	—	—	1·5
	S.A. Gas Company—															
2424	Sulphate of Ammonia	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0·14
2276	Sulphate of Ammonia	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0·15
2277	Sulphate of Ammonia	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1·5
	Wallaroo-Mt. Lyell Fertilisers, Ltd.—															
2295	Bone Dust	—	—	—	—	—	—	50·0	51·0	—	—	—	—	—	—	5·2
2291	W.M.L. Granular High Grade Super.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	8·09
2292	W.M.L. High Grade Super.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	6·57
2433	W.M.L. High Grade Super.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	6·7
2437	W.M.L. High Grade Super.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	8·3
2439	W.M.L. High Grade Super.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	5·2
2438	W.M.L. 48% Super.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	7·3
2293	Sulphate of Ammonia	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0·08
2294	2 : 1 Super and Ammonia No. 3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	4·8
	Webb, A. J.—															
2435	Carbonate of Lime	—	—	47·3	49·6	—	—	—	—	92·0	95·8	—	—	—	—	1·7

Results of analyses obtained by the Government Agricultural Analyst from samples procured by Inspectors of Fertilisers, during the six months ended 31/12/34.

Sample No.	Name of Firm and Fertiliser.	Phosphate. Water Soluble. Vendor's Guarantee.	Phosphate. Water Soluble. Result of Analysis.	Phosphate. Citrate Soluble. Vendor's Guarantee.	Phosphate. Citrate Soluble. Result of Analysis.	Phosphate. Acid Soluble. Vendor's Guarantee.	Phosphate. Acid Soluble. Result of Analysis.	Phosphate. Total. Vendor's Guarantee.	Phosphate. Total. Result of Analysis.	Nitrogen. Vendor's Guarantee.	Nitrogen. Result of Analysis.	Nitrogen as Nitrates. Vendor's Guarantee.	Nitrogen as Nitrates. Result of Analysis.
		%	%	%	%	%	%	%	%	%	%	%	%
	Adelaide Chemical and Fertilizer Co., Ltd.—												
2442	Bone and Super.	21·0	22·5	10·0	10·5	12·0	18·4	43·0	51·4	1·6	2·3	—	—
	Heddle, J. A.—												
2297	Bone Manure	—	—	—	—	28·0	31·9	28·0	31·9	4·25	4·1	—	—
	Wallaroo-Mt. Lyell Fertilisers Ltd.—												
2441	W.M.L. High Grade Super.	45·0	46·1	—	—	—	—	45·0	46·1	—	—	—	—

Results of analyses obtained by the Government Agricultural Analyst from samples procured by Inspectors of Fertilisers during the six months ended 31/12/34. —*continued.*

Sample No.	Name of Firm and Fertiliser.	Potash in Water Soluble Form. Vendor's Guarantee.	Potash in Water Soluble Form. Result of Analysis.	Calcium Oxide, CaO. Vendor's Guarantee.	Calcium Oxide, CaO. Result of Analysis.	Calcium Oxide Expressed as Calcium Sulphate, CaSO4. Vendor's Guarantee.	Calcium Oxide Expressed as Calcium Sulphate, CaSO4. Result of Analysis.	Bone Manure, Fine Material. Vendor's Guarantee.	Bone Manure, Fine Material. Result of Analysis.	Agricultural Lime, Fine Material. Vendor's Guarantee.	Agricultural Lime, Fine Material. Result of Analysis.	Gypsum Fine Material. Vendor's Guarantee.	Gypsum Fine Material. Result of Analysis.	Phosphate Fertiliser, Fine Material. Vendor's Guarantee.	Phosphate Fertiliser, Fine Material. Result of Analysis.	Moisture.
		%	%	%	%	%	%	%	%	%	%	%	%	%	%	
	Adelaide Chemical and Fertilizer Co., Ltd.—															
2442	Bone and Super.	—	—	—	—	—	—	60·0	59·0	—	—	—	—	—	—	6·6
	Heddle, J. A.—															
2297	Bone Manure	—	—	—	—	—	—	66·0	67·9	—	—	—	—	—	—	6·2
	Wallaroo-Mt. Lyell Fertilisers Ltd.—															
2441	W.M.L. High Grade Super.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	6·2

Results of analyses obtained by the Government Agricultural Analyst from samples procured by Inspectors of Fertilisers during the six months ended 30/6/35.

NOTE.—*Deficiencies greater than permitted under Section 12 of the Act, are shown in bold type.*

Sample No.	Name of Firm and Fertiliser.	Phosphate.								Nitrogen.		Nitrogen as Nitrates.	
		Water Soluble.		Citrate Soluble.		Acid Soluble.		Total.					
		Vendor's Guarantee.	Result of Analysis.	Vendor's Guarantee.	Result of Analysis.	Vendor's Guarantee.	Result of Analysis.	Vendor's Guarantee.	Result of Analysis.	Vendor's Guarantee.	Result of Analysis.	Vendor's Guarantee.	Result of Analysis.
	Adelaide Chemical and Fertilizer Co. Ltd.—	%	%	%	%	%	%	%	%	%	%	%	%
2354	Abattoirs Blood Manure	—	—	—	—	—	—	—	—	13·0	13·0	—	—
2352	Bone and Super.	21·0	23·0	10·0	8·4	10·0	15·9	41·0	47·3	1·6	2·0	—	—
2353	Bone Dust	—	—	—	—	40·0	47·3	40·0	47·3	3·5	4·2	—	—
2400	No. 1 Complete Manure	20·0	21·8	8·0	9·3	4·0	3·0	32·0	34·1	1·5	1·58	—	—
2901	P.N.P. Mixture	28·0	28·1	1·0	2·0	2·0	1·0	31·0	31·1	1·5	1·72	—	—
2355	Sulphate of Ammonia (neutral)	—	—	—	—	—	—	—	—	20·6	21·2	—	—
2398	2 : 1 Super. and Ammonia No. 3	30·0	30·0	1·0	1·5	1·0	0·7	32·0	32·2	6·87	7·8	—	—
2399	3 : 1 Super. and Ammonia No. 2	34·0	34·3	1·0	1·7	1·0	1·1	36·0	37·1	5·15	5·3	—	—
2351	Top Special Super.	45·0	45·8	—	—	—	—	45·0	45·8	—	—	—	—
2397	Top Special Super.	45·0	46·5	—	—	—	—	45·0	46·5	—	—	—	—
	Cresco Fertilisers Ltd.—												
2363	Blood Manure	—	—	—	—	—	—	—	—	12·0	12·5	—	—
2362	Bone and Super.	21·0	21·4	10·0	**6·0**	12·0	15·6	43·0	43·0	1·6	1·8	—	—
1721	Complete Manure 2-2-1	18·0	21·1	1·0	1·2	1·0	0·5	20·0	22·8	8·24	8·37	—	—
2392	45 Super.	45·0	46·7	—	—	—	—	45·0	46·7	—	—	—	—
2361	45 Super, (Granulated)	45·0	47·8	—	—	—	—	45·0	47·8	—	—	—	—
401	48 Super.	48·0	48·2	—	—	—	—	48·0	48·2	—	—	—	—
1720	Super. and Ammonia 1 and 1	22·0	24·7	1·0	1·3	1·0	0·6	24·0	26·6	10·3	10·7	—	—
2391	Super. and Ammonia 2 and 1	30·0	30·8	1·0	2·5	1·0	0·9	32·0	34·2	6·87	7·13	—	—
	E. and W. Hackett Ltd.—												
2366	"Floranid"	—	—	—	—	—	—	—	—	46·0	46·5	—	—
2365	"Floraphos	65·0	71·6	—	—	—	—	65·0	71·6	15·6	15·4	—	—
	Heddie, J. A.—												
2851	Bone Manure	—	—	—	—	28·0	32·7	28·0	32·7	42·5	3·9	—	—
	Harris Scarfe Ltd.—												
2368	"Wondergrowth"	133·0	137·0	—	—	—	—	133·0	137·0	12·0	12·1	—	—
	Jacobs, W.—												
1719	Bone Manure	—	—	—	—	—	—	29·0	29·7	4·0	5·56	—	—
	James, A.—												
2389	Carbo-Lime	—	—	—	—	—	—	—	—	—	—	—	
	Wallaroo-Mt. Lyell Fertilisers Ltd.—												
2358	Abattoirs Bone Manure	—	—	—	—	25·0	25·0	25·0	25·0	6·0	7·48	—	—
2359	Blood Manure	—	—	—	—	—	—	—	—	13·0	14·4	—	—
2356	Bone Dust	—	—	—	—	40·0	44·1	40·0	44·1	3·5	3·9	—	—
2393	Guano Supe.	27·0	29·7	3·0	4·7	3·0	3·9	33·0	38·3	—	—	—	—
2357	W.M.L. High Grade Super.	45·0	47·6	—	—	—	—	45·0	47·6	—	—	—	—
2394	W.M.L. High Grade Super.	45·0	45·1	—	—	—	—	45·0	45·1	—	—	—	—
2902	Island Phosphate	—	—	—	—	82·0	89·5	82·0	89·5	—	—	—	—
2395	L. I. G. E.	28·5	30·9	4·5	7·0	5·0	5·8	38·0	43·7	0·25	0·34	—	—
2396	3 : 1 Super. and Ammonia No. 2	34·0	35·8	1·0	2·1	1·0	0·7	36·0	38·6	5·15	5·24	—	—
	Wingfield Casing Coy. Pty. Ltd.—												
2390	Flood Manure	—	—	—	—	—	—	—	—	11·0	10·74	—	—

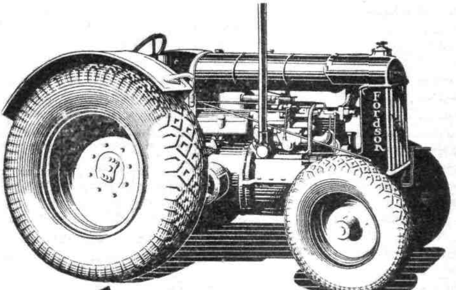
* Other samples were taken during this period, but owing to the unsatisfactory nature of the containers used for sampling, the results are not shown.

Results of analyses obtained by the Government Agricultural Analyst from samples procured by Inspectors of Fertilisers, during the six months ended 30/6/35.—*continued.*

Sample No.	Name of Firm and Fertiliser.	Potash in Water Soluble Form.		Calcium Oxide, CaO.		Calcium Oxide Expressed as Calcium Sulphate. CaSO4.		Bone Manure, Fine Material.		Agricultural Lime, Fine Material.		Gypsum, Fine Material.		Phosphate Fertiliser, Fine Material.		Moisture.
		Vendor's Guarantee.	Result of Analysis.	Vendor's Guarantee.	Result of Analysis.	Vendor's Guarantee.	Result of Analysis.	Vendor's Guarantee.	Result of Analysis.	Vendor's Guarantee.	Result of Analysis.	Vendor's Guarantee.	Result of Analysis.	Vendor's Guarantee.	Result of Analysis.	
		%	%	%	%	%	%	%	%	%	%	%	%	%	%	%
	Adelaide Chemical and Fertilizer Co. Ltd.—															
2354	Abattoirs Blood Manure	—	—	—	—	—	—	—	—	—	—	—	—	—	—	7·6
2352	Bone and Super.	—	—	—	—	—	—	60·0	67·8	—	—	—	—	—	—	6·0
2353	Bone Dust	—	—	—	—	—	—	50·0	52·5	—	—	—	—	—	—	4·8
2400	No. 1 Complete Manure	4·5	4·2	—	—	—	—	—	—	—	—	—	—	—	—	6·96
2901	P.N.P. Mixture	7·5	8·2	—	—	—	—	—	—	—	—	—	—	—	—	8·3
2355	Sulphate of Ammonia (neutral)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0·1
2398	2 : 1 Super. and Ammonia No. 3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	6·43
2399	3 : 1 Super. and Ammonia No. 2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	8·21
2351	Top Special Super.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	8·8
2397	Top Special Super.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	9·57
	Cresco Fertilisers Ltd.—															
2363	Blood Manure	—	—	—	—	—	—	—	—	—	—	—	—	—	—	8·47
2362	Bone and Super.	—	—	—	—	—	—	60·0	86·0	—	—	—	—	—	—	4·46
1721	Complete Manure 2-2-1	9·7	9·1	—	—	—	—	—	—	—	—	—	—	—	—	3·65
2392	45 Super.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	9·58
2361	45 Super. (Granulated)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	5·68
401	48 Super.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	6·35
1720	Super. and Ammonia 1 and 1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	2·08
2391	Super. and Ammonia 2 and 1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	6·46
	E. and W. Hackett Ltd.—															
2366	"Floranid"	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0·2
2365	"Floraphos	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0·49
	Heddle, J. A.—															
2851	Bone Manure	—	—	—	—	—	—	65·0	70·1	—	—	—	—	—	—	5·9
	Harris Scarfe Ltd.—															
2368	"Wondergrowth"	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	Jacobs, W.—															
1719	Bone Manure	—	—	—	—	—	—	75·0	75·0	—	—	—	—	—	—	9·77
	James, A.—															
2389	Carbo-Lime	—	—	47·0	50·3	—	—	—	—	90·0	98·9	—	—	—	—	0·3
	Wallaroo-Mt. Lyell Fertilisers Ltd.—															
2358	Abattoirs Bone Manure	—	—	—	—	—	—	60·0	67·0	—	—	—	—	—	—	5·15
2359	Blood Manure	—	—	—	—	—	—	—	—	—	—	—	—	—	—	7·1
2356	Bone Dust	—	—	—	—	—	—	50·0	55·0	—	—	—	—	—	—	4·9
2393	Guano Super.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	7·22
2357	W.M.L. High Grade Super.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	8·8
2394	W.M.L. High Grade Super.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	8·84
2902	Island Phosphate	—	—	—	—	—	—	—	—	—	—	—	—	100·0	99·7	2·8
2395	L. I. G. E.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	8·05
2396	3 : 1 Super. and Ammonia No. 2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	7·33
	Wingfield Casing Coy. Pty. Ltd.—															
2390	Blood Manure	—	—	—	—	—	—	—	—	—	—	—	—	—	—	10·98

* Other samples were taken during this period, but owing to the unsatisfactory nature of the containers used for sampling the results are not shown.

Reduce Harvesting Costs—
Increase Profits . . .
with a FORDSON



REAR END POWER TAKE-OFF
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(Tests by Mr. E. J. C. Rennie, Melb. University)

The pneumatic-tyred English Fordson has proved its ability to reduce costs of primary production. That is why it is establishing new sales records. This unit is adaptable to all classes of ploughing and harvesting . . . its high top gear ensures quick transport of 5-6 ton loads. You can buy Fordson on easy terms spread to suit your convenience.

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FORDSON PRICE HAS BEEN REDUCED!

BORDEAUX MIXTURE: ITS MANUFACTURE AND USE.

[A. G. STRICKLAND, M.Sc., Chief Horticultural Instructor.]

Mr. A. G. Strickland, M.Sc., has supplied the following information to the Secretary of the Coonawarra Branch of the Agricultural Bureau, who asked for particulars of the manufacture and use of Bordeaux Mixture:—

No. 1.—(1) Slake 8lbs. of freshly burnt lime, strain off all sediment and make up to 40galls. If a *hydrated lime* is used, instead of quick-lime, no slaking is required: it is only necessary to mix sufficient water with 10*lbs.* (instead of 8lbs.) of the hydrated lime to make 40galls. of lime water. When using a hydrated lime, it should be noted that more of this material is necessary than of freshly burnt quicklime. Fresh quicklime of certain quality is often difficult to obtain, and the use of a prepared hydrated lime in making Bordeaux Mixture is far more satisfactory and strongly recommended.

(2) Dissolve 12lbs. of bluestone ("neige" or "snow" crystals dissolve quickly, and are recommended in preference to the coarser crystals of bluestone), in water, and dilute the solution to a total bulk of 40galls.

(3) Run the 40galls. of lime stock and the 40galls. of bluestone stock simultaneously through strainer into the spraying vat. The limewater and bluestone solution should not be blended until each has been diluted to the necessary extent, *i.e.*, in this case to 40galls. each. Different authorities suggest methods other than the above for mixing Bordeaux Mixture. However, one other method only need be mentioned, *i.e.*, the procedure recommended by Cunningham in New Zealand when using hydrated lime. This procedure is as follows:—

(1) Fill spray tank about three parts full of water.

(2) Dissolve required quantity of bluestone in water, add to the spray tank, and start agitator.

(3) Weigh out required quantity of *hydrated lime*, mix to thin paste with water, and with agitator still in motion, pour slowly into spray vat, at the same time filling the tank to capacity with additional water. Keep agitator running for a few minutes, and then apply spray.

No. 2.—Bordeaux Mixture should always be used as soon as possible after preparation. When the two solutions are blended as described in (1) a complex chemical reaction occurs, resulting in the formation of a gelatinous and adherent precipitate. If prepared Bordeaux Mixture is allowed to stand, the precipitate may become granular or crystalline, and this change in its physical nature markedly deteriorates the value of the spray mixture.

No. 3.—*Use of Bordeaux Mixture after Fruit has Set.*

If this spray is used at all after fruit has formed, it should be used at half-strength. Experiments in Victoria showed that half-strength Bordeaux (6-4-80) used after fruit forming reduced the amount of scabby fruit, but resulted in an appreciable percentage of blemished fruit (crimson skin blush).

If possible, spraying should be confined to Bordeaux 12-8-80 (to which may be added 1lb. lime casein spreader per 100galls) in autumn, as final leaves are falling, and again at the pink bud stage in spring. It appears on the available evidence that even half-strength Bordeaux will cause some blemish if applied after fruit formation.

VETERINARY SCIENCE.

Published by Messrs. Bailliere, Tindall & Cox, of 7 and 8, Henrietta Street, London, the fifth edition of "Elementary Veterinary Science" by H. Thompson, M.R.C.V.S., has been revised by A. C. Duncan, F.R.C.V.S., B.Sc., is now available at 10s. 6d. The volume is well-illustrated and is one which should prove most useful to agricultural students, farmers and stockmen.

DEPARTMENT OF AGRICULTURE.

SINGLE TEST EGG-LAYING COMPETITION, 1935-36.

Conducted at Parafield Poultry Station.

LEADING SCORES TO WEEK ENDED 27TH OCTOBER, 1935.

FIRST GRADE EGGS ONLY.

SECTION 1.—WET MASH.

Class 1.—White Leghorns.

	Eggs Laid.	Bird Nos.
Singles—		
E. McKee	147	27
H. C. Stacy	143	36
E. McKee	142	29
Trios—		
E. McKee	406	28–30
W. H. A. Hodgson	371	298–300
B. Cooke	362	4–6

PARAFIELD POULTRY STATION.

NOW BOOKING ORDERS FOR Summer, 1936.

ECGS FOR HATCHING AND DAY OLD CHICKENS

WHITE LEGHORNS.

EGGS.—7s. 6d. per Setting of 15 Eggs. Incubator Lots, 30/- per 100.

DAY OLD CHICKENS.—15s. per dozen; £3/10/- in lots of 100.

BLACK ORPINGTONS.

EGGS.—10/- per Setting of 15 Eggs. Incubator Lots, £2 per 100.

DAY OLD CHICKENS.—17/6 per dozen; £4 per 100.

BLACK MINORCAS.

EGGS.—7s. 6d. per Setting of 15 Eggs. Incubator Lots, 30/- per 100.

DAY OLD CHICKENS.—15s. per dozen; £3/10/- in lots of 100.

Free on Rail, Salisbury.

DELIVERY.—CHICKS—January to March.
EGGS—January to February.

Intending breeders should realise the importance of establishing their flocks with only the very best of stock, also pay particular care to the size of the egg. The future of the poultry industry in South Australia is almost entirely dependent on the export trade; the size of the egg for export is of the greatest importance. The breeding stock at Parafield is carefully selected and every egg set or sold is a minimum weight of 2ozs., and a large percentage considerably over.

All Eggs and Chickens sold from Parafield Poultry Station are guaranteed to be produced at Parafield.

EARLY BOOKING IS ADVISABLE.

Further particulars can be obtained from the Manager, Parafield Poultry Station, Salisbury, or Poultry Expert, Department of Agriculture, Flinders Street, Adelaide.

C. F. ANDERSON, Poultry Expert.

Teams—		
C. R. Wharton	694	127–132
W. Sickert	693	169–174
J. J. Devlin	681	205–210

Class No. 2.—Any other Light Breed.

Singles—		
A. Heaysman (Cuckoo Leghorn)	135	323
Langmaid and Bettison (Black Minorca)	107	321

Class No. 3.—Black Orpingtons.

Singles—		
A. G. Dawes	126	327
K. Pennack	128	340
H. J. Mills	117	335
Trios—		
H. J. Mills	314	331–333
A. P. Urlwyn	268	465–467
K. Pennack	259	337–339
Teams—		
H. J. Mills (only 5 birds)	521	331–336
K. Pennack	517	337–342
H. H. Gallagher	473	343–348

Class No. 4.—Any other Heavy Breed.

Singles—		
H. J. Mills (Rhode Island Red)	152	364
V. F. Gameau (Rhode Island Red)	123	381
Trios—		
K. Pennack (Barnevelder)	338	388–390
V. F. Gameau (Rhode Island Red)	295	379–381
H. J. Mills (Rhode Island Reds) (2 birds only competing)	248	364–366
Teams—		
K. Pennack (Barnevelder)	585	385–390
V. F. Gameau (Rhode Island Reds)	494	379–384
A. G. Dawes (Rhode Island Reds)	456	367–372

SECTION 2.—DRY MASH.

Class No. 5.—White Leghorns.

Singles—		
G. R. Cowell	120	391
A. J. Monkhouse	111	402
G. R. Cowell	108	396
Trios—		
A. J. Monkhouse	268	400–402
A. J. Monkhouse	246	397–399
Teams—		
A. J. Monkhouse	514	397–402
G. R. Cowell	405	391–396

Class No. 7.—Black Orpingtons.

Singles—		
W. R. Christie	98	409

Class No. 8.—Any other Heavy Breed.

W. R. Christie (Rhode Island Red)	97	412

SECTION 3.—WET MASH.

Singles—		
Eric Pratt, Abattoirs (White Leghorn)	135	434
Herbert Oliver, McLaren Vale, Black Orpington)	131	442
Peter Western, Ascot Park (White Leghorn)	130	415
Warren Hannaford, Paracombe (White Leghorn)	129	422
Lyol Stone, Morphett Vale (Black Orpington)	128	443
Owen Robinson, Ascot Park (White Leghorn)	125	424
Malcolm Booth, Bridgewater (Black Orpington)	124	445

OFFICIAL SINGLE TEST EGG-LAYING COMPETITION, 1935-36.

CONDUCTED AT PARAFIELD POULTRY STATION.

ONLY FIRST GRADE EGGS RECORDED.

SECTION 1.—WET MASH.

Class No. 1.—White Leghorns.

Competitor.	Bird No.	First Grade Eggs. Progressive Totals to 27th Oct., 1935.		Competitor.	Bird No.	First Grade Eggs. Progressive Totals to 27th Oct., 1935.	
B. Cooke, Kanmantoo.	1	86		A. J. Monkhouse, Woodside.	49	60	
	2	86			50	131	
	3	105	277		51	113	304
	4	110			52	131	
	5	129			53	74	
	6	123	362		54	105	310
			639				614
	7	—		J. F. Smith, Meadows.	55	99	
	8	—			56	92	
	9	—	—		57	7	198
	10	—			58	78	
	11	—			59	12	
	12	—	—		60	118	208
			—				406
A. H. Matthews, Bridgewater	13	121		A. Young, Bridgewater.	61	124	
	14	—			62	108	
	15	137	258		63	102	334
	16	131			64	72	
	17	101			65	129	
	18	72	304		66	100	301
			562				635
H. F. Muirson, Yundi.	19	dead		R. W. McAlister, Yundi.	67	57	
	20	91			68	92	
	21	69	160		69	111	260
	22	82			70	78	
	23	126			71	49	
	24	58	266		72	102	229
			426				489
E. McKee, 5, Rose Street, Carrondown.	25	99		T. Duhring, Mallala.	73	130	
	26	dead			74	dead	
	27	147	246		75	84	214
	28	135			76	54	
	29	142			77	66	
	30	129	406		78	80	200
			652				414
H. C. Stacy, Meadows.	31	80		R. J. Underdown, Meadows.	79	42	
	32	78			80	71	
	33	137	295		81	128	241
	34	48			82	87	
	35	105			83	74	
	36	143	296		84	120	281
			591				522
T. Cleaver, Bridgewater.	37	52		S. Hill, Bridgewater.	85	82	
	38	81			86	123	
	39	83	216		87	108	313
	40	116			88	[illegible]	
	41	76			89	[illegible]	
	42	94	286		90	101	342
			502				655
C. Sandstrom, Yundi.	43	100		W. R. Hedger, Yundi.	91	69	
	44	dead			92	86	
	45	dead	100		93	92	247
	46	65			94	94	
	47	63			95	70	
	48	117	245		96	94	258
			345				505

EGG-LAYING COMPETITION—*Continued.*

Competitor.	Bird No.	First Grade Eggs. Progressive Totals 27th Oct., 1935.	
Langmaid & Bettison, Salisbury.	97	74	
	98	51	
	99	73	198
	100	113	
	101	61	
	102	2	176
			374
E. Portlock, Meadows.	103	130	
	104	106	
	105	114	350
	106	92	
	107	81	
	108	106	279
			629
Murray Powell, Jupiter Creek.	109	132	
	110	45	
	111	114	291
	112	88	
	113	137	
	114	36	261
			552
G. W. Bignell, Meadows.	115	116	
	116	89	
	117	88	293
	118	73	
	119	117	
	120	118	308
			601
W. M. Field, Yundi.	121	102	
	122	28	
	123	86	216
	124	63	
	125	65	
	126	117	245
			461
C. R. Wharton, Meadows.	127	106	
	128	115	
	129	127	348
	130	127	
	131	110	
	132	109	346
			694
H. H. Hefford, Murray Bridge.	133	92	
	134	124	
	135	107	323
	136	46	
	137	124	
	138	82	252
			575
F. W. Gage, Meadows.	139	94	
	140	4	
	141	dead	98
	142	111	
	143	81	
	144	75	267
			365
W. H. L. Norman, Echunga.	145	77	
	146	62	
	147	—	139
	148	132	
	149	90	
	150	56	278
			417

Competitor.	Bird No.	First Grade Eggs. Progressive Totals to 27th Oct., 1935.	
B. R. Whittington, Yundi.	151	105	
	152	62	
	153	90	257
	154	114	
	155	105	
	156	84	303
			560
B. C. Sanders, Meadows.	157	114	
	158	124	
	159	127	365
	160	112	
	161	52	
	162	dead	164
			529
H. H. Gallagher, Pooraka.	163	48	
	164	95	
	165	102	245
	166	78	
	167	54	
	168	116	248
			493
W. Sickert, Meadows.	169	137	
	170	83	
	171	127	347
	172	96	
	173	117	
	174	133	346
			693
W. Restall, Echunga.	175	60	
	176	—	
	177	84	114
	178	112	
	179	97	
	180	104	313
			457
A. G. Dawes, 230, Portrush Road, Glenunga.	181	121	
	182	94	
	183	91	306
	184	69	
	185	68	
	186	120	257
			563
G. W. Sykes, Yundi.	187	113	
	188	70	
	189	61	244
	190	81	
	191	78	
	192	116	275
			519
R. Bartley, Meadows.	193	76	
	194	132	
	195	100	308
	196	77	
	197	102	
	198	116	295
			603
A. & H. Gurr, Mindaroo Poultry Farm, Bradbury.	199	66	
	200	91	
	201	68	225
	202	103	
	203	73	
	204	75	251
			476

EGG-LAYING COMPETITION—*Continued.*

Competitor.	Bird No.	First Grade Eggs. Progressive Totals to 27th Oct., 1935.	
J. J. Devlin, Meadows.	205	108	
	206	105	
	207	138	351
	208	109	
	209	85	
	210	136	330
			681
D. J. Foxwell, Echunga.	211	109	
	212	87	
	213	39	235
	214	17	
	215	102	
	216	39	158
			393
F. J. Buck, Meadows.	217	102	
	218	111	
	219	140	353
	220	78	
	221	93	
	222	83	254
			607
J. A. Grist, Yundi.	223	22	
	224	55	
	225	86	163
	226	36	
	227	—	
	228	90	126
			289
L. A. King, Meadows.	229	124	
	230	112	
	231	dead	236
	232	18	
	233	72	
	234	19	109
			345
R. W. Sando, Echunga.	235	92	
	236	64	
	237	71	227
	238	92	
	239	83	
	240	72	247
			474
E. W. Young, Meadows.	241	125	
	242	104	
	243	99	328
	244	101	
	245	—	
	246	55	156
			484
A. Jarvis, Yundi.	247	94	
	248	56	
	249	81	231
	250	106	
	251	85	
	252	136	327
			558
	253	2	
	254	3	
	255	—	5
	256	2	
	257	3	
	258	2	7
			12
S. Bridge, Yundi.	259	105	
	260	120	
	261	100	325
	262	56	
	263	104	
	264	92	252
			577
H. G. Egarr, Meadows.	265	98	
	266	80	
	267	25	203
	268	18	
	269	99	
	270	41	158
			361
R. H. Smith, Yundi.	271	110	
	272	79	
	273	105	294
	274	126	
	275	41	
	276	110	277
			571
J. M. Lawson, Meadows.	277	118	
	278	120	
	279	93	331
	280	68	
	281	108	
	282	61	237
			568
J. O. Marshall, Yundi.	283	12	
	284	100	
	285	110	222
	286	118	
	287	113	
	288	77	308
			530
G. Joyce, Meadows.	289	13	
	290	140	
	291	68	221
	292	83	
	293	125	
	294	90	298
			519
J. A. Bradtke, Yongala.	295	11	
	296	—	
	297	97	
		108	
W. H. A. Hodgson, Salisbury.	298	133	
	299	116	
	300	122	
		371	
A. W. McDonald, Gawler.	301	53	
	302	97	
	303	102	
		252	
J. H. Dowling, Glossop.	304	88	
	305	117	
	306	21	
		226	

EGG-LAYING COMPETITION—*Continued.*

Competitor.	Bird No.	First Grade Eggs. Progressive Totals to 27th Oct., 1935.	
A. P. Urlwin, Balaklava.	307	92	
	308	77	
	309	18	
		187	
L. S. Ekers, Mount Compass.	310	103	
	311	29	
	312	116	
		248	
V. E. Williams, Semaphore Park.	313	119	
	314	119	
	315	121	
		359	
F. P. Munzberg, Tanunda.	316	120	
	317	107	
	318	121	
		348	
Total Class 1		26,586	

Class 2—Any Other Light Breed.

Competitor.	Bird No.	First Grade Eggs. Progressive Totals to 27th Oct., 1935.	
Langmaid & Bettison, Salisbury. (Black Minorcas.)	319	87	
	320	61	
	321	107	
		255	
A. Heaysman, Government Road, Eden Hills. (Cuckoo Leghorns.)	322	99	
	323	135	
	324	64	
		298	
Total Class No. 2.		553	

Class No. 3—Black Orpingtons.

Competitor.	Bird No.	First Grade Eggs. Progressive Totals to 27th Oct., 1935.	
A. G. Dawes, 230, Portrush Road, Glenunga.	325	49	
	326	25	
	327	126	200
	328	71	
	329	75	
	330	95	241
			441
H. J. Mills, 108, Edward Street, Edwardstown.	331	116	
	332	100	
	333	98	314
	334	90	
	335	117	
	336	dead	207
			521
K. Pennack, Pooraka.	337	115	
	338	96	
	339	48	259
	340	128	
	341	53	
	342	77	258
			517
H. H. Gallagher, Pooraka.	343	100	
	344	75	
	345	83	258
	346	105	
	347	82	
	348	28	215
			473
B. Cooke, Kanmantoo.	349	24	
	350	36	
	351	26	
		86	
H. H. Hefford, Murray Bridge.	352	101	
	353	67	
	354	52	
		220	
J. H. Dowling, Glossop.	355	71	
	356	33	
	357	102	
		206	
L. S. Ekers, Mount Compass.	358	85	
	359	64	
	360	106	
		255	
A. G. Dawes, 230, Portrush Road, Glenunga.	452	60	
	453	86	
	454	81	227
	455	10	
	456	105	
	457	95	210
			437
A. P. Urlwin, Balaklava.	465	75	
	466	105	
	467	88	
		268	
Total Class No. 3		3,424	

Class No. 4.—Any Other Heavy Breed.

Competitor.	Bird No.	First Grade Eggs. Progressive Totals to 27th Oct., 1935.	
H. J. Mills, 108, Edward Street, Edwardstown. (Rhode Island Reds.)	361	1	
	362	dead	
	363	63	64
	364	152	
	365	96	
	366	dead	248
			312
A. G. Dawes, 230, Portrush Road, Glenunga. (Rhode Island Reds.)	367	71	
	368	87	
	369	62	220
	370	99	
	371	60	
	372	77	236
			456
F. F. Welford, 1, Ludgate Circus, Colonel Light Gardens. (Rhode Island Reds.)	373	98	
	374	116	
	375	dead	214
	376	29	
	377	85	
	378	87	201
			415
V. F. Gameau, Findon Road, Woodville. (Rhode Island Reds.)	379	55	
	380	117	
	381	123	295
	382	96	
	383	24	
	384	79	199
			494

EGG-LAYING COMPETITION—*Continued.*

Competitor.	Bird No.	First Grade Eggs. Progressive Totals to 27th Oct., 1935.	
K. Pennack, Pooraka. (Barnevelders.)	385	93	
	386	85	
	387	69	247
	388	117	
	389	104	
	390	117	338
			585
A. G. Dawes, 230, Portrush Road, Glenunga. (Rhode Island Reds.)	458	15	
	459	83	
	460	98	196
	461	15	
	462	88	
	463	90	193
			389
Total Class No. 4			2,651

SECTION 2.—DRY MASH.

Class No. 5.—White Leghorns.

Competitor.	Bird No.	First Grade Eggs.	
G. R. Cowell, Balhannah.	391	120	
	392	50	
	393	26	196
	394	62	
	395	39	
	396	108	209
			405
A. J. Monkhouse, Woodside.	397	38	
	398	107	
	399	101	246
	400	65	
	401	92	
	402	111	268
			514
G. R. Cowell, Balhannah.	403	102	
	404	93	
	405	46	241
	406	89	
	407	60	
	408	dead	149
			390
Total Class No. 5			1,309

Class No. 7.—Black Orpingtons.

Competitor.	Bird No.	First Grade Eggs.
W. R. Christie, Upper Mitcham.	409	98
	410	74
	411	81
		253
Total Class No. 7		253

Class No. 8.—Any Other Heavy Breed.

Competitor.	Bird No.	First Grade Eggs.
W. R. Christie, Upper Mitcham. (Rhode Island Reds.)	412	97
	413	39
	414	79
		215
Total Class No. 8		215

SECTION 3.—WET MASH.

Home Project Utility Section.—Any Breed.

Competitor.	Bird No.	First Grade Eggs. Progressive Totals to 27th Oct., 1935.
Peter Western, Ascot Park School. (White Leghorn.)	415	130
Peter Western, Ascot Park School. (White Leghorn.)	416	120
William Sando, Echunga School. (White Leghorn.)	417	104
Douglas Marshall, Yundi School. (White Leghorn.)	418	109
Norman Page, Murray Bridge School. (White Leghorn.)	419	105
Kelvyn & Brian Nicholls, Finniss School. (White Leghorn.)	420	99
Dean Colwell, Grange School (White Leghorn.)	421	87
Warren Hannaford, Paracombe School. (White Leghorn.)	422	129
W. Horne, Woodville School. (White Leghorn.)	423	dead
Owen Robinson, Ascot Park School. (White Leghorn.)	424	125
June Chapman, Woodchester School. (White Leghorn.)	425	84
Rosa Hunt, Morphett Vale School. (White Leghorn.)	426	81
Jack O'Sullivan, Morphett Vale School. (White Leghorn.)	427	107
Peter Taylor, Morphett Vale School. (White Leghorn.)	428	55
James Taylor, Morphett Vale School. (White Leghorn.)	429	105
William Gregory, Victor Harbour School. (White Leghorn.)	430	88
Ian Bruce, McLaren Flat School. (White Leghorn.)	431	81
Clifford Burford, Smithfield School. (White Leghorn.)	432	60
Tom Callaghan, Smithfield School. (White Leghorn.)	433	18
Eric Pratt, Abattoirs School. (White Leghorn.)	434	135
Stanley Pratt, Abattoirs School. (White Leghorn.)	435	117
Alan Yelland, Cunliffe School. (Minorca.)	436	67
Gordon Gallasch, Gilles Plains School. (White Leghorn.)	437	112

EGG-LAYING COMPETITION—*Continued.*

Competitor.	Bird No.	First Grade Eggs. Progressive Totals to 27th Oct., 1935.
Clarence King, Tarlee School. (White Leghorn.)	438	60
Olive Pitman, Gilles Plains School. (Black Orpington.)	439	103
Donald Heading, Sturt School. (Black Orpington.)	440	117
Clive Steer, Sturt School. (Black Orpington.)	441	109
Herbert Oliver, McLaren Vale School. (Black Orpington.)	442	131
Lyol Stone, Morphett Vale School. (Black Orpington.)	443	128
Ray Candy, Noarlunga School. (Black Orpington.)	444	51
Malcolm Booth, Bridgewater School. (Black Orpington.)	445	124
Murray Heneker and Frank Short, Hamley Bridge School. (*Black Orpington.*)	*446*	*107*
Peter Boucaut, Seaton Park School. (Rhode Island Red.)	447	24
Peter Preece, Gilles Plains School. (Rhode Island Red.)	448	66
Cliff Crosser, Wellington Road School. (White Leghorn.)	449	118
John Keldoulis, Orroroo School. (Black Orpington.)	450	106
Bruce Dooland, Thebarton School. (Black Orpington.)	451	76
Alan Yelland, Cunliffe School. (Rhode Island Red.)	464	62
Total		3,500

FEEDING TESTS AT PARAFIELD POULTRY STATION.

[New Series of Tests by C. F. ANDERSON, Government Poultry Expert.]

In continuing the experimental feeding tests at Parafield Poultry Station, a new series of tests commenced on 1st April, 1935. Five tests each of 50 white Leghorn pullets were selected. The pullets were chosen as nearly even in age, type, and maturity as was possible.

In order to gain further information on the various methods of feeding, some of the tests are similar to the series which concluded on 31st March, 1935.

The following are the methods to be adopted, together with the results from 1st April to 30th June.

Feeding Tests commenced on 1st April, 1935.

1. Wet mash, composed of crushed barley and crushed wheat, with greenfeed and meatmeal; 2ozs. wheat per day.

2. Standard bran and pollard mash, with greenfeed and meatmeal; 1½ozs. wheat per day.

3. Bran and crushed wheat mash, with greenfeed and meatmeal; 2ozs. wheat per day.

4. Mash of crushed oats and crushed wheat with greenfeed and meatmeal; wheat, 2ozs. per day.

5. Commencing with a crushed barley and crushed wheat mash, greenfeed, meatmeal and then the feeding to be changed according to the season of the year.

	No. Eggs Laid 1st April, 1935, to 30th Sept. 1935.	No. Eggs Laid Month of October, 1935.	Total Eggs Laid 1st April, 1935, to 31st October, 1935.
No. 1 Test	3,507	880	4,387
No. 2 Test	3,553	851	4,404
No. 3 Test	3,662	884	4,546
No. 4 Test	3,124	847	3,971
No. 5 Test	3,079	842	3,921

AGRICULTURE IN THE TEMPERATE AND SUB-TROPICAL CLIMATES OF THE SOUTH.

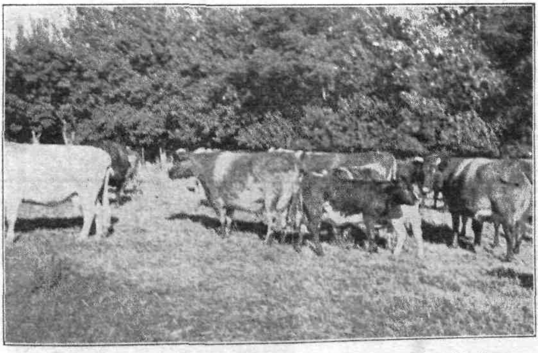
[A Report by the Deputy Director of Agriculture (W. J. Spafford) to His Excellency Sir Winston Dugan, K.C.M.G., C.B., D.S.O., Governor in and over the State of South Australia and its Dependencies in the Commonwealth of Australia. Mr. Spafford took a brief tour of portions of the principal agricultural countries in the same climatic zones as the settled portions of Australia, in fulfilment of the appointment as Honorary Commissioner, conferred upon him by His Excellency, to inquire into and report upon the Production and Preparation for Marketing of Agricultural Products, including Crops and Livestock in South America, South Africa, and New Zealand.]*

ARGENTINA.

(Continued from page 387.)

CATTLE IN ARGENTINA.

At present the best beef cattle in the world are produced in enormous numbers in Argentina, but this was not always so. Away back in 1553 there were introduced from Brazil to Paraguay, which was then part of the River Plate, seven



Stud Shorthorn Cows with Calves at Foot on an Estancia in Argentina. Shorthorns are easily the most important breed of cattle in Argentina, the pure-breds of the breed constituting 80 per cent of all pure-breds, and over 56 per ce.. of the total cattle of the whole country. Very high-class animals of the breed are to be found throughout the cattle-breeding districts, and cows of the quality shown above are by no means unusual.

cows and one bull, and from then onwards several small lots were brought into the country, until the definite founding of Buenos Aires in 1580 when 300 cows were taken to the locality. Again in 1588 a herd of 3,000 head was taken to the Corrientes, and these, like the previous lots, consisted of descendants of the Iberian cattle brought out from Spain by the early expeditions, and large numbers

*Tour made in the company of Col. C. P. Butler ("Yattalunga," of the *Advertiser*

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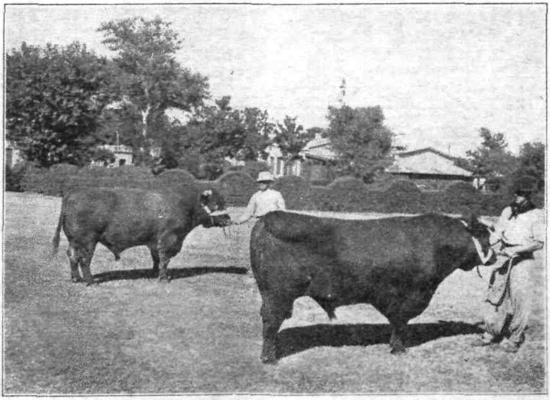
of this type are still to be found in various localities in South America, but more particularly in the hotter localities in the north. During the wars which raged for so long after these cattle were introduced they went wild, and bred up very rapidly on the Great Plain extending from Buenos Aires to the Chaco, and for many years did not appear to deteriorate to any great extent, but eventually it was noticed that they were getting smaller as their numbers increased. An estimate of the cattle on the Great Plain in 1780 gave the figure as 48,000,000 head, most of which were wild, but as the only part of these animals of much value—the hide—became increasingly valuable they were freely killed so as to export the hides to Spain, and to such purpose that by the end of the 18th century the herds were reduced to 6,500,000 animals. To allow the wild cattle to breed up, the authorities periodically refused to grant licences to ship hides, and this appears to have had the desired effect. During this period, and until the middle of the 19th century, cattle were the principal source of wealth of the country, and the export trade in hides and fat was the main business of the time.



British-bred Shorthorn Bulls used in a Stud on an Estancia in Argentina. Long, deep, low-set bulls are very popular in Argentina, and prove the ideal type for the production of the rapid-maturing, sappy baby-beef desired by the British market.

In the early part of the 19th century the production of salted meat for export was encouraged so as not to leave the carcasses wasting on the land after the hides were removed, and some progress was being made in this direction by 1882, when the first frigorifico was established in the country. The successful freezing of beef for export completely changed the outlook for cattle-raisers, and from that time very rapid progress in the production and improvement of the cattle of *Argentina has taken place. The discovery that beef merely chilled could be* transported with safety to Europe from Argentina also helped on the industry.
No. 1 another factor of great importance in connection with the improvement of
No. 2 Test -producing *breeds of cattle* has *been the holding of Cattle* Shows with
No. 3 Test ...t Palermo for a great many years. The first Palermo Show was held
No. 4 Test ....
No. 5 Test ......was organised by Don Gervasio A. de Posadas.

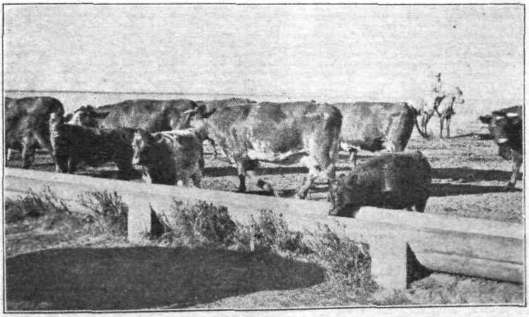
The Cattle-producing Districts.

Most of the cattle of Argentina are produced in the very good agricultural districts of the country, for, of the total of 32,211,855 shown to be present in the 1930 census, 11,639,442 were in the Province of Buenos Aires, 3,832,556 in Corrientes, 3,641,804 in Santa Fé, 3,074,697 in Córdoba, and 2,534,729 in the Province of Entre Rios. In these localities the soils are good, the rainfall plentiful and well distributed, and the climate equable, and so natural and established pastures flourish, cattle need no housing, and continuity of supplies of animals is ensured. That there is very little difference in the supply of cattle from month to month can be seen by the number of animals slaughtered at the frigorificos, most of which are for export:—

Monthly Slaughterings at Frigorificos in 1933.*

	Per cent.		Per cent.
January	9.2	July	8.5
February	7.6	August	8.5
March	8.7	September	8.4
April	7.8	October	8.2
May	8.1	November	8.0
June	7.9	December	9.1

* "Cattle and Beef Survey" of Imperial Economic Committee—June, 1934.



Type of Shorthorn Cows maintained in Argentina for the production of Baby-beef. Big, roomy pure-bred Shorthorn cows are mated to low-set Shorthorn bulls to produce the baby-beef steers for which Argentina is justly famous. Hundreds of thousands of steers in the primest of condition, weighing 1,100lbs. and over by the time they are 2 years of age, are produced annually, and mostly from cows such as those illustrated.

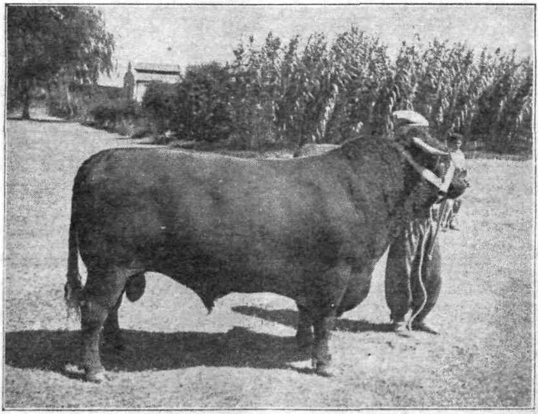
The Breeds of Beef Cattle.

Of the 32,211,855 animals (including milch cows) recorded at the 1930 census, the breeding of 9,274,994 was *not specified*, but of the others (22,936,861) 18,109,465 were Shorthorns, 2,786,064 Herefords, 1,256,189 Aberdeen-Angus, and 12,121 Red Polled, and a few Sussex, Devon, Zebu, and West Highland. Quite a considerable proportion of the animals of which the breeding is not shown must be direct descendants of the original importations, and will be located right in the north of Argentina. In the better districts the Shorthorn is supreme, and the conditions are certainly ideal for the rapid development of the animals of this breed. In those districts where Cattle Tick are found, but are not too bad, the

Hereford does quite well, and the Aberdeen-Angus is holding its own. Most cattlemen in Argentina, whether from estancias, frigorificos, or saleyards, dislike Zebu cattle and their crosses, but although it is generally recognised that Zebu types would never be kept where better breeds will do well, there are some places where this breed does better than others. Argentina is fortunate in that the area in the north where British breeds of cattle do not thrive is very limited indeed, and in this small area Spanish cattle and Zebu crosses are maintained with advantage.

Management of Cattle in Argentina.

It is common experience in Argentina that if the desired low-set, rapid-maturing type of cattle is to be maintained it is necessary to introduce frequently top-sire bulls from Great Britain, whether the breed be Shorthorn, Hereford, or Aberdeen-Angus. Some breeders go so far as to use nothing but imported bulls in their studs, whilst others are content to secure such bulls every second generation or so. The conditions in which the trade cattle are raised are almost ideal for the



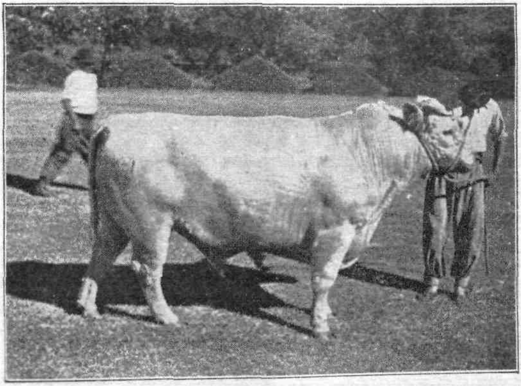
A High-quality Imported British-bred Shorthorn Bull used in a stud in Argentina for the production of low-set bulls to sire baby-beef steers.

purpose, but are quite dissimilar to those obtaining where the principal breeds of beef cattle were developed. The change from cold-temperate to sub-tropical climate tends to favour rapid development, and for the same reason tends to change the low-set round-barrelled type so necessary for the production of baby-beef to something taller and narrower, thus necessitating frequent importations of the original stock to keep the herds to type.

Large numbers of beef cattle, mainly bulls, are imported into Argentina annually, and the greatest possible care is exercised to prevent the introduction of diseases into the country. A large, well equipped, and hygienically maintained quarantine station is located on a spacious site on the wharf at Buenos Aires, and no imported animal is allowed away from this institution until all necessary tests have been made and until the specified time for detention has elapsed. In times when much disease is about, or when large numbers of animals are being

attended to, or on any occasion when it is essential to keep people from the quarantine station, sailors from the Navy are put on guard, and whenever this has been done there has not been a case of an unauthorised person getting into the institution.

Although the natural pastures of the cattle country are fairly good, much better results are secured from sown pastures. Lucerne is easily the most important of the forage plants used, and it is the only one that persists for a number of years. Of the annuals, Rye and Oats are sown in the autumn, and make strong early winter growth, and are looked upon with much favour by cattle-men because they are almost ideal on which to put freshly weaned calves. Forage Sorghum and Sudan grass are grown in the summer, and on these crops steers top up quickly, particularly if they get the run of a Lucerne field at the time they are on the Sorghum. Of the introduced forage plants which appear without sowing *Cynodon dactylon* (Couch or Bermuda grass) and *Bromus unioloides* (Prairie grass) are the most prevalent and the most useful. Couch grass tends to choke



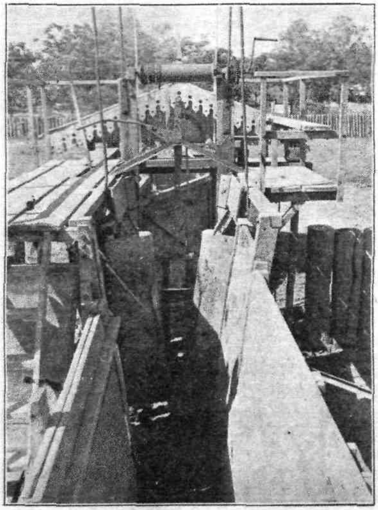
White Shorthorn Bull, as used in Argentina for colour mating. Rich ruby-red Shorthorns are very popular in Argentina, but most breeders produce all of the usual Shorthorn colours, endeavouring, however, to keep them free from washiness by mating red bulls to roan cows and roan bulls to red cows, and aim to get a proportion of rich roans by mating white bulls to deep-red cows.

out the Lucerne, and is difficult to eradicate, but where better plants are not desired provides a great bulk of fattening forage. The Prairie grass is much appreciated by stockmen, for when a fair sprinkling of it is present in the Lucerne stands cattle do very much better than when it is absent.

In the great majority of seasons plenty of rain is received and it is well distributed, still an occasional season occurs in which the pasture growth is poor. This is easily guarded against, because in most years the growth is very luxuriant, and a great many cattle-raisers store hay and silage against these years of shortage. When silage is to be made the first growth of the Lucerne crops, which usually contains some weeds, is taken, and later cuts, which are cleaner, are converted into hay.

Because of the very early maturing of the cattle, it is necessary to mate the heifers whilst still young, otherwise too great a proportion of them prove sterile. When about 15 months old the heifers are put to the bull, and if they miss for the autumn calving, are tried for the spring calving, and should they fail both times they are topped up for slaughter.

It is usual to have two calvings in the better parts of the cattle country—one in autumn and the other in spring, otherwise it appears difficult to secure a sufficiently high percentage of calves, and continuity of supplies could not be maintained. Most managers favour the autumn drop because the calves get no check at weaning, particularly if put straight on to Rye or Oats sown for the purpose.



Crush Pen on an Estancia in Argentina. An important part of the equipment of estancias, where thousands of cattle are maintained, is the crush pen. The illustration shows a rather elaborate type of crush pen used in many parts of the country. The operator, who stands upon a platform above the beast, has several levers to control gates, bail, and two semi-cylindrical pillars, which press into the flanks of the animal. When the beast is held in the crush the gates at head, sides and tail can be opened, so that every part of the animal is get-at-able except the small area of skin covered by the flank pillars. A *hand winch is also provided on the platform for raising the head of the* beast, or even lifting an animal that gets down.

Weaning of calves is rarely done early, and the calves are generally nine months old before being removed from their mothers, and some go so far as to leave the calf with the cow until she calves again, knowing that the older one will be discarded for the new arrival.

It is frequently necessary to bring the cattle into the homestead yards to attend to them when troubled with Foot-and-Mouth disease and for dipping, and advanage is taken of these occasions by some managers to reclassify the mobs of

fattening animals. As a weighbridge is usually part of the estancia equipment, some cattle-men do their classifying according to weight, the result being almost perfectly matched mobs developing at about the same rate as each other.

Because of the added attractiveness of good colours a great deal of attention is given to this phase of breeding of beef cattle in Argentina. Some cattle-men are concentrating on rich ruby-red Shorthorns, and are gradually eliminating animals of other colours; but most breeders are retaining all colours, but are endeavouring to keep them free from washiness by putting red bulls on roan cows, roan bulls on red cows, and to keep up the proportion of rich roans put white bulls on deep-red cows.

All steers on almost every estancia are dehorned as calves, and generally with a knife, rather than with caustic or with calf-dehorner. Buyers of cattle for export as chillers will not look at steers with horns, but for home consumption and for canning their presence does not appear to make much difference. On many properties heifers which are going to the stud are the only animals not dehorned, whilst some leave horns on all females, only removing them from steers. If the percentage rejects of chillers is to be kept at a low figure, dehorning is essential, and particularly so where the animals have to be brought some distance by rail or road to the slaughter-house.

Diseases and Pests of Cattle.

Although Argentina has such good cattle-raising conditions, cattle-raisers have considerable trouble with diseases and pests, the worst of which are Foot-and-Mouth disease and Cattle Tick, but they also have to contend with Anthrax, Tuberculosis, Scours (Enteque), Actinomycosis, and Blowfly.

Because of the insistence of Great Britain—the principal purchaser of Argentine beef—the inspection of cattle sold for export is particularly strict, and animals arriving at a frigorifico without a certificate from a veterinary officer stating that they were free from disease when they left the estancia, are killed for home consumption or canning, or are returned to the owner. They undergo another inspection immediately before slaughter, and all portions of the carcasses are carefully inspected whilst being dressed.

Foot-and-Mouth disease is a constant source of worry to cattle-men, for in many districts two outbreaks a year are to be expected, and the loss of condition of the animals during the attacks, the cost of inspection at selling time, the restrictions on movements of stock from one locality to another, and being kept out of overseas markets, such as the United States of America, are all handicaps. On the other hand, loss by death is light, and where the pastures are really good the animals recover quickly and soon put on condition. A development in connection with Foot-and-Mouth disease which is making the position more serious for cattle-men is that Blowflies are becoming increasingly troublesome, and strike the animals as soon as the disease leads to the breaking of the skin. Whilst the Blowflies are troublesome, a careful watch must be kept on the animals, and it is frequently necessary to lasso and throw animals and treat the affected parts with a liquid which will lead to the expulsion of the maggots.

In common with other beef-exporting countries, Tuberculosis is the cause of a good deal of the rejecting of meat for export, but it is no worse in this country than in others, and as a matter of fact, considering how large is the proportion of highly-bred, quick-maturing animals in the herds of Argentina, the disease is not as bad as might be expected. Great care is taken at the quarantine station to prevent the entry of cattle with Tuberculosis, and the meat inspection in the frigorificos is very thorough indeed.

Anthrax occurs in some of the cattle districts of Argentina, but is kept in check by one, or at most two, vaccinations a year.

A very severe form of Scours, known in the country as Enteque, the origin and cause of which is not known, leads to a considerable loss amongst cattle, particularly to young stock brought from rougher pastures on to fresh succulent Lucerne. Some of the animals die, but the majority lose condition rapidly and become very emaciated; and although most of them recover, few of them appear to make full development after a severe attack. The estancias suffering least from this trouble appear to be those that gradually accustom stock from outside to the pastures, keep their whole places clean and tidy, and prevent the formation of waterholes in which the cattle can wallow.

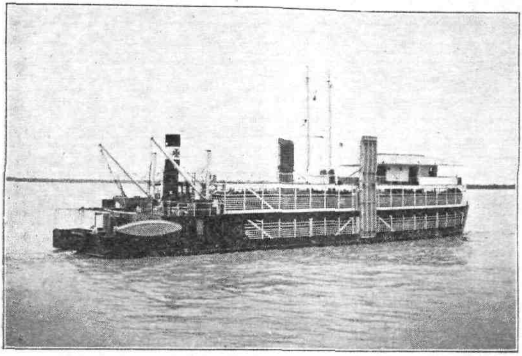
In much of the cattle country of Argentina Cattle Tick need constant attention, and as the Government is gradually pushing the pest from the south, stringent regulations for its control exist and are strictly enforced. Within the barrier zone a chain of inspectors is stationed, and cattle cannot be sent south of a fixed line unless inspected within 48 hours of shipment, and from north of the line all animals reaching a frigorifico must be slaughtered within 24 hours. The frequent dipping of the animals in Tick-infested areas tends to make them as quiet as dairy cows; for portion of the year it is necessary to dip every three weeks at least, and every six weeks for the remainder of the year.

Treating a Fly-blown Calf on an Estancia in Argentina. When Foot-and-Mouth disease leads to the breaking of the skin of cattle during the warmer parts of the year the animals are frequently struck by blow-flies at the spot, and immediate attention is necessary to prevent serious damage being done to the beast.

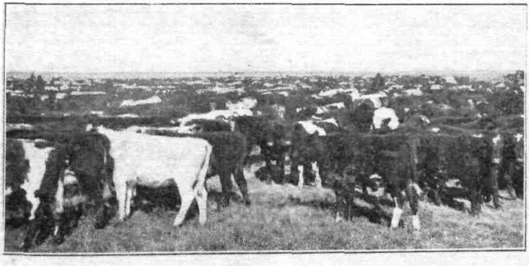
Transport of Cattle.

Except from the far north of Argentina, most cattle sold for slaughter, whether for export or home consumption, do not have to be travelled the great distances common in some other countries, nevertheless very few if any are reared right alongside of the killing works. The conditions of the country are such that most cattle-men prefer to send the fat animals by some sort of conveyance rather than make them walk to market, and for the purpose railway trains and cattle boats are utilised. Cattle trains consist of trucks with doors in the ends, and when these

doors are opened the whole train is like a long corridor, and cattle being loaded can walk from the loading end to the front of the train. Cattle-men and railwaymen prefer these end openings, and the only serious objections raised to them is the difficulty of disinfection, and the awkwardness when several small mobs of



Cattle Boat Used in Argentina for the Transport of Cattle to Killing Works. Specially constructed for the purpose, many of these boats are commodious and well-equipped. The illustration depicts one of the boats belonging to Argentine Estates of Bovril Limited, which bring cattle from the north, and are fitted with showers to keep cool water sprayed on the animals, and are provided with strong fans to keep the air moving.



A Mob of some Thousands of Dehorned Shorthorn Steers, about 2½ years of age, on an Estancia in the Tick-infested Areas of Argentina. Buyers of export cattle insist on the dehorning of the animals, and if carrying horns they can only be sold for local requirements, canning, or meat extract.

cattle are to be taken on the one train. In the effort to keep down diseases it is obligatory on the railway authorities to see that all trucks used are thoroughly disinfected, and on appearances this is carried out thoroughly.

Quite a big proportion of cattle for slaughter are brought into frigorificos or markets in cattle boats, and some of these, notably those owned by Argentine Estates of Bovril Limited, are really large and conveniently equipped. Those

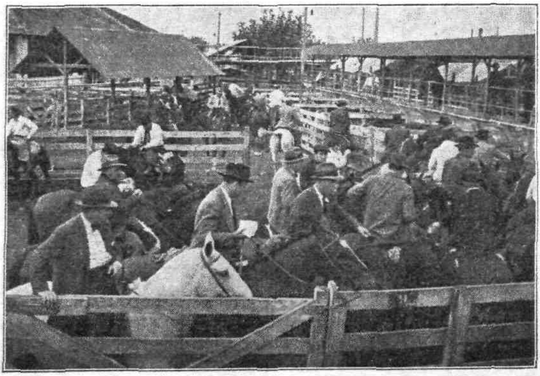
bringing cattle from the north are fitted with showers to keep cool water sprayed on the animals, and are provided with strong fans to keep the air in circulation.

Cattle are carried very well in Argentina, as is to be expected when practically all of them are without horns, when so many are brought by water, and when trains have so much level country to run on. Bad bruises are exceptional on cattle bought for export, and it is generally conceded that this is due very largely to the absence of horns.

From figures supplied it appears that young chillers trucked 250 miles or so to Buenos Aires lose about 8 to 10 per cent. of their weight during transit if loaded in the morning the train leaves, and about 2 per cent. more if loaded the afternoon before.

Purchasing the Cattle.

Cattle are purchased at saleyards and at frigorificos by live weight. When animals are offered by auction, buyers bid in centavos or fractions per kilo live weight, and as in most cases the animals had passed over the weighbridge before



A Cattle Sale in Progress in the Buenos Aires Cattle Sale Yards. Practically all work in these sale yards is done on horseback, there being over 1,000 saddled horses in the yards throughout the period of the sale. Besides the moving of cattle being controlled by horsemen, all branding is done from horseback, and nearly all buyers are mounted, and make their bids from this position.

being sold, buyers know exactly what they are bidding for. For steers for export most of the purchasing is done by negotiation on the estancias, and payment is made on the live weight of the animals when they reach the frigorifico. In the saleyards most of the beef cattle are bought without putting them up for auction, or as is usually stated in Argentina, "by ear," and so even when there is a big yarding the auctions are relatively few, and do not occupy a great deal of time.

The cattle saleyards in Buenos Aires are conducted in a manner quite dissimilar to anything in Australia and a visit on a sale day proves very interesting. Practically all work in connection with cattle is done on horseback, there being over 1,000 saddled horses in the yards throughout the progress of the sale. Groups of cattle are constantly being moved by horsemen, and as the yards and

roadways are cemented, the job is difficult, but the horses are well-trained and particularly surefooted. Beasts frequently fall, but although the horses gallop, twist, and turn, frequenters of the market affirm that it is only occasionally that a horse slips over. The branding of cattle is done from horseback, and many branders are to be seen with a paint-pot hanging from the saddle for the purpose. Most of the cattle-buyers are on horseback, and while the auctioneer walks along a platform above the cattle calling the bids, the buyers ride along the roadway on the side of the pens opposite to the auctioneer, and give their bids. The provision of wide roadways alongside all cattleyards means that an enormous area of land is necessary for a cattle saleyards.

A few English-type saddles are used by horsemen in the saleyards, but most of them are the true South American type, with several layers of sheepskins and somewhat like a feather bed, and quite a noticeable proportion are without stirrups. None of the bridles have throat, nose, or chin strap, and quite a number of the horses are ridden without a bridle, but with a piece of rope, greenhide, or chain tied tightly through the mouth and around the bottom jaw, with two reins attached under the jaw. The stock-horses are of very good type and are maintained in excellent condition. No whips are used in the yards except the riding whip common to the country.

Slaughtering Cattle.

Although there has been a great reduction in recent years in the number of cattle slaughtered, and the amount of beef exported and consumed locally, the yearly handlings are still very considerable.

*Reduction in Beef Production in Argentina.**

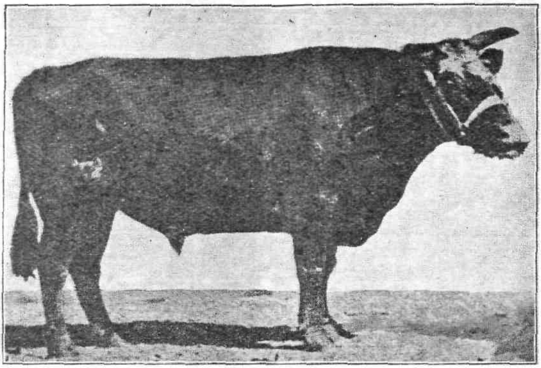
	1925.	1932.
	Tons.	Tons.
Production at slaughter houses, salting establishments, and meat-producing works (estimated)	1,028,200	838,300
Production at Frigorificos	857,200	632,000
Total production (*a*)	1,885,400	1,470,300
Less exports (including preserved meat)	738,200	444,300
Available for local consumption (estimated)	1,147,200	1,026,000
Per capita consumption (estimated)	255lbs.	204lbs.

(*a*) Excluding farm production. An unofficial estimate gives farm slaughterings of cattle at 1,000,000 head per annum, and on this basis, nearly 200,000 tons of beef would be available for consumption on farms, adding about 40lbs. to the per capita consumption of the whole country.

* "Cattle and Beef Survey" of Imperial Economic Committee—June, 1934.

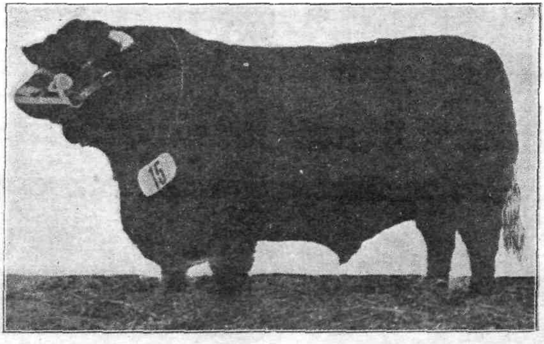
NOTE.—In translating the table into English a tonelada was taken at 0.9842 ton.

It is in the frigorificos that all cattle for export are slaughtered, and most of these are equipped with modern plant and are conducted on efficient and hygienic lines. As soon as cattle arrive at a frigorifico, whether it be by rail, boat, or on foot, they are inspected by a veterinary officer and then passed over a weighbridge, and if free from disease are placed in yards with feed and water, and in many cases under a roof, in that portion of the frigorifico yards set aside for sound animals. If not fit for export they must be kept in that part of the yards used for cattle for local consumption only. When to be slaughtered the cattle are



[From *Buenos Aires Herald.*

Champion Shorthorn Bull at the Palmero (Buenos Aires) Cattle Show in 1875. Vast strides have been made in the improvement of beef cattle in recent years, and a present-day champion is a different looking animal than the one illustrated above.



[From *Buenos Aires Herald.*

Champion Shorthorn Bull at the Palermo (Buenos Aires) Cattle Show in 1934. So much improvement has taken place with this breed that typical animals of to-day show greater differences to the type of 60 years ago than are noticeable between distinct breeds of beef cattle. A glance at the preceding illustration will show how great has been the change in type.

passed through a large swimming bath, and are afterwards held for some time under shower baths, the water being used to cool down the animals and to remove dirt which might make it more difficult to keep the meat clean during dressing. From the baths the cattle are driven quietly up the steep ramp to the killing floor. All movement of cattle in the yards is done without dogs or whips, so that the risk of fresh bruises is reduced to a minimum, and only noise and the electric switch are allowed as aids in driving.

The killing is done with sledge-hammer, and it is a very rare occurrence for it to be necessary to use more than the one blow. The carcass is then picked up by hind legs with a crane, knifed, and slowly travels to a shallow trough into which it is dropped on its back for the skinning of the belly-line, and the removal of the legs at knees and hocks. In some places the trough to catch the blood, over which the carcass travels before skinning starts, is walled off from the rest of dressing floor, and by the time the carcass reaches the skinners most of the blood has left it and is away from other offals. After butchers have skinned along the underline the carcass is again picked up by crane and is attached to a travelling chain which it does not leave until hung in the cooling chambers, if for export or local consumption as fresh meat, or if being canned or used for meat extract it does not leave the chain until every bit of meat has been removed from the bones. All of the work of dressing the carcasses is done by knife, except the splitting of the carcasses into two, where very efficient and easily handled electrically-driven hand saws are used.

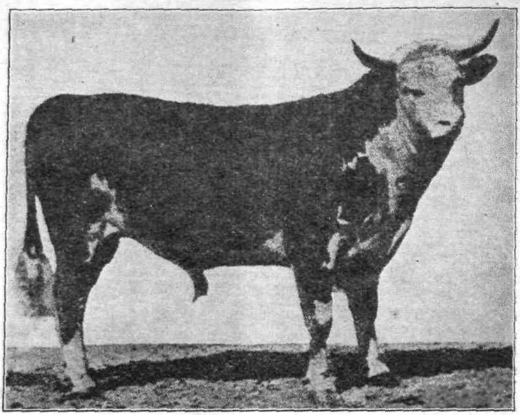
The hides are a very valuable part of the carcass, particularly at the northern canning and meat-extract works, where quite a lot of Criolla cattle are slaughtered. These Criolla cattle are the direct descendants of the original Iberian cattle, and although not good beef animals like the British breeds, are suitable for canning and meat-extract, and have particularly thick and valuable hides. Great care is taken to keep the hides undamaged, and on removal they are closely examined for knife marks, and the slightest mark made by a skinner is recorded against him according as whether it is slight, fairly serious, or right through the skin, and the punishment consists in putting offenders off for periods varying with the severity of the damage. The butchers in Argentina are very skilful with the knife, and cut or even badly scored hides are an exceptional occurrence.

The inspection of beef intended for export is very thorough indeed, no portion of the meat goes into the cool chamber without having been scrutinised, whilst all important glands are exposed and cut open, and all portions of the animal specially liable to carry any of the serious diseases are subjected to particular attention by trained Veterinary Surgeons.

In Argentina the frigorificos are very extensive industrial concerns, and the larger of them are almost self-contained, purchasing practically nothing but raw materials, and to do this they must maintain their own cooperage for barrels for fat, box-making plant, can-making, solidifying oil, soap-making, stockingette mills for carcass covers, label-printing, and, indeed, everything required. Near the large towns the frigorificos maintain cafeterias for their employees, and also sell them meat at reduced prices, whilst out in the country the meat works generally control all activities of the whole village which builds up around the works, including housing, water supply, milk, stores, &c.

Export of Beef from Argentina.

Before the growing of crops was seriously undertaken in Argentina the production of cattle for export was her principal industry. In earlier days cattle were maintained to produce hides and fat for export, but when the frozen beef trade was opened up the cattle-rearing business took on a different aspect, and meat became the most valuable part of the carcass. From the very commencement of this new era the Argentine breeder started to improve his cattle from a beef-producing point of view, and succeeded so well that the country quickly established



[From *Buenos Aires Herald*.

Champion Hereford Bull at the Palermo (Buenos Aires) Cattle Show in 1875. As is the case with Shorthorns, typical animals of 60 years ago were very poor when compared to present-day Herefords.

[From *Buenos Aires Herald*.

A Prominent Prize-Winning Hereford Bull at the Palermo (Buenos Aires) Cattle *Show in 1934. Other than in colours and markings, there is no similarity* **between the Herefords of 60 years ago and those of to-day, as can be seen by comparing the picture of this bull with the illustration immediately preceding.**

a very extensive export trade in beef, and as the Argentines are big meat-eaters the number of animals required for slaughter for export and home consumption is quite considerable. The following table shows the slaughterings of cattle of recent years, but does not include those slaughtered on farms, which are estimated to be about 1,000,000 head annually.

*Cattle Slaughtered for Export and Home Consumption.**

Year.	Home Consumption.	Export.	
	Head.	Head.	Per Cent.
1912-14 (average)	1,882,000	1,369,000	42.1
1924	4,115,000	3,497,000	45.9
1925	4,222,000	3,153,000	42.8
1926	3,980,000	2,818,000	41.5
1927	3,781,000	2,996,000	44.2
1928	3,808,000	2,459,000	39.2
1929	3,837,000	2,300,000	37.5
1930	3,828,000	2,138,000	35.8
1931	3,604,000	1,779,000	33.0
1932	3,653,000	1,691,000	31.6
1933	3,985,000	1,718,000	30.1

* "Boletin Mensual de Estadistica Agropecuaria."

These figures hardly give a true picture of the position because in the numbers are included stock under one year of age, of which a lot are slaughtered, but mostly for home consumption. For instance, in 1925, of these youngsters 1,001,000 were slaughtered, and 916,000 of them were consumed locally, and in 1932, although 635,000 were slaughtered, only 9,000 were exported. The next table, showing as it does the tons of beef exported, gives a better idea of how important this export trade is to Argentina.

*Exports of Beef from Argentina.**

Year.	Frozen Beef.	Chilled Beef.	Jerked Beef.	Total Frozen, Chilled, and Jerked.	Preserved Meat (Mainly Beef).
	Tons.	Tons.	Tons.	Tons.	Tons.
1914	323,026	40,038	2,339	365,403	12,878
1924	362,479	358,376	15,317	736,172	80,135
1925	291,889	366,513	13,479	671,881	66,303
1926	223,111	423,836	9,322	656,269	60,152
1927	232,637	459,202	8,159	699,998	60,520
1928	122,690	376,948	4,780	504,418	65,767
1929	119,763	352,233	338	472,334	67,967
1930	97,168	339,997	153	437,318	61,421
1931	82,342	346,591	25	428,9[illegible]3	54,197
1932	36,073	364,704	4	400,781	43,568
1933	30,944	344,445	—	375,389	54,117
1934†	31,986	344,120	—	375,206	60,090

The United Kingdom in recent years has taken about 90 per cent. of the Argentine exports of chilled and frozen beef; in 1932, the proportion rose to 96 per cent.

* "Cattle and Beef Survey" of Imperial Economic Committee, June, 1934.

† "Boletin Mensual de Estadistica Agropecuaria", January, 1935.

NOTE.—In translating the figures into English a tonelada was taken as 0.9842 ton.

Not only is the quantity of beef exported from Argentina really considerable, but the quality of the chilled beef is of the very highest. As a producer of baby beef Argentina stands alone, for she has a very large area of country with natural conditions which enable her to produce annually hundreds of thousands of steers in the primest of condition weighing 1,100lbs. and more by the time they are two years old. Kept on their mothers in Lucerne fields until they are nearly a year old, weaned on Rye or Oat crops, transferred to Lucerne fields, and fattened on Sorghum and Lucerne, they make ideal chillers, and the very best of baby beef. In these ideal beef-raising conditions the fattening steers, from the time they are weaned until they are ready for slaughter for export, will increase in weight consistently at the rate of about 45lbs. per month. Not only have they the necessary weight, but they are of the highest quality, being in most cases pure-bred Shorthorns, and more often than not their sire's sire was a high-priced bull imported from Great Britain.

SHEEP IN ARGENTINA.

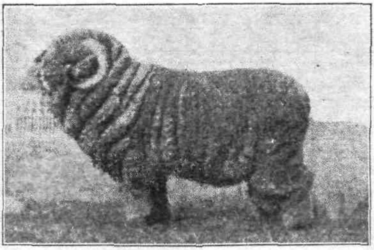
Besides being very prominent as a breeder of cattle Argentina is also an important sheep-producing country, and at the last census of livestock taken in 1930 was maintaining 44,413,221 sheep. Although in a general way sheep require different natural conditions to those necessary for cattle, at present the Province of Buenos Aires is easily the most important part of the country for sheep as it is for cattle, and the Provinces of Entre Rios, Corrientes, and Córdoba carry a fairly high proportion of both kinds of livestock. On the other hand the Province of Santa Fé and the Territory of the Chaco which support a lot of cattle have relatively few sheep, whilst the Territories of Santa Cruz, Chubut, La Pampa, and Rio Negro are very important sheep-producing districts, but do not maintain many cattle. The principal sheep-raising parts of the country are:—

Province of Buenos Aires	14,086,741
Territory of Santa Cruz	6,880,392
Territory of Chubut	5,004,173
Province of Entre Rios	3,396,295
Province of Corrientes	3,298,657
Territory of Rio Negro	2,315,985
Territory of La Pampa	2,253,070
Province of Córdoba	1,109,783
Province of Santiago del Estero	1,108,714
Other Districts	4,959,411
Total for Argentina	44,413,221

Although sheep were brought into the country a little before cattle were introduced, the same amount of interest was not taken in the smaller animals, which in the early days of settlement appeared to be due to the fact that there was no ready sale for wool, and the people did not like mutton as much as beef as a foodstuff. As a matter of fact, to the present day, it is commonly stated throughout Argentina that beef is the only meat that can be eaten year in and year out, in much the same way as Australians say it of mutton. The first sheep brought to South America by the Spaniards were of the breed known as Churra, and some of these were brought from Peru to Paraguay (then a part of the River Plate) in 1549, a further consignment was taken to Tucuman in the following year, and other introductions are recorded for 1553 to Santiago de Estero, 1558 to Catamarca, 1561 to Mendoza, and 1580 to Buenos Aires. By the end of the 18th century the Churra sheep had become separated into two types, called respectively the Pampas and the Criollas. These sheep have been described as being somewhat similar to Angora goats, the rams having straight horns, and the animals growing long, straight and glossy wool. In the early days of the 19th century Mr. John Marriott, an Argentine stockbreeder, wrote that "the Pampa

sheep constituted a breed very distinct from the Criollas. Larger with much more frame, longer legs on which, as well as on the head, they generally had red or black marks; long thin head, with great abundance of wool, nearly always wavy, they were incomparably superior to the Criollas as a foundation for breeding Merinos."

In 1794 the first consignment of Merinos, consisting of 20 ewes and 10 rams, was received in the country, and the animals were placed in Uruguay, but they appear to have disappeared entirely. There was sent from Spain in 1804 a group of 24 sheep of the best blood, but no records have been left of the breed of these animals, nor of their ultimate fate. The first flock of Merinos established in the country was in 1818, when the American Consul in Buenos Aires, Mr. Thomas Lloyd Halsey, got together a flock of this breed, and this was the starting point of the improvement of the sheep of this part of South America. Messrs. Thomas and Robert Gibson started several flocks of sheep in 1835, with Pampa ewes, and mated these to Merino rams. The importations of Merino sheep reached 4,200 in the period 1836-1838, and in 1842 the Gibsons introduced seven ewes and four rams of the Saxon breed, and a few years later brought in Cotswold, Cheviot, Leicester, Lincoln, and Romney Marsh, of which assortment they found Lincoln to give the best results.



[From *Almanaque del Ministerio de Agricultura*, 1935.
Champion Argentinian Merino Ram at the Palermo (Buenos Aires) Agricultural Show in *1934*.

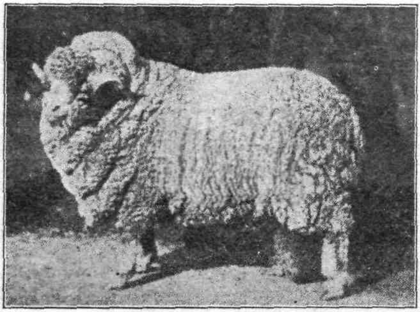
The two breeds of sheep which showed so much promise in the early part of the 19th century—Lincoln and Merino—continued in favour, and at the last census in 1930 constituted about 65 per cent. of the whole flocks of Argentina, and the only other breeds making progress, all of which has been made in recent years, are Romney Marsh and Corriedale. The 1930 census showed the following numbers of the various breeds of sheep:—

Lincoln		14,504,005
Merino—		
Argentina	13,191,306	
Australian	1,132,607	
		14,323,913
Romney Marsh		7,556,531
Corriedale		3,397,469
Hampshire		368,382
Oxford		24,667
Shropshire		10,852
Karakul		1,419
Not Specified		4,225,983
Total		44,413,221

Judged by the sheep seen in sale yards and at frigorificos this classification must include everything that has the least resemblance to a particular breed, because the percentage of nondescript animals sent in for slaughter appears to be a good deal higher than the figures quoted.

Merino Sheep in Argentina.

Merino sheep were introduced into Argentina shortly after the first lot reached Australia, but the breed did not make anything like the same progress in the two countries. In Argentina so much attention has been given by breeders of live-stock to the production of beef and the improvement of beef cattle that sheep have been more or less neglected. This specialising in cattle-raising activities which has put Argentina in front of the world as a producer of the highest-quality beef, certainly contributed to the lack of development of the sheep industry, but the slow progress being made with the Merino breed seems to be due more to the unsuitability of the natural conditions of most of the country than to anything else. Natural conditions almost ideal for the raising of cattle are hardly likely to favour Merinos, because they require Mediterranean climate, undulating or even hilly land, dry underfoot conditions, and a dry period of the year, and do not thrive to full advantage on extremely fertile, level-plain land, rank luxuriant



[From *Almanaque del Ministerio de Agricultura*, 1935.

Champion Australian Merino Ram at the Palermo (Buenos Aires) Agricultural Show in 1934. In Argentina, Merino Sheep are classed as Argentine Merinos and Australian Merinos, and separate prizes are provided for each type at the principal agricultural shows.

growth, and evergreen pastures which are liable to be wet for extended periods. North of Argentina's low-rainfall belt is really good cattle country, and west and south of this dry zone, where the climatic conditions would be fairly favourable for the Merino, the area of country receiving more than 8in. of average annual rainfall is relatively so small that the number of Merinos carried can never be very large. The position might be altered to some extent if a constant and ready supply of high-class Merino rams was always available to keep up the virility of the flocks, as is necessary in portions of Australia where Merinos are maintained, but failing this aid it does not appear that Argentina will become a really important Merino-sheep country.

Sheep for Mutton.

The position as regards the production of sheep for meat is quite different than the production of large quantities of fine-quality wool, for some of the mutton breeds of sheep can withstand rank, damp pastures fairly well, particularly if they are reared in hilly country and are only brought on to the rich plains for their

last couple of lambs, and some of the poor-woolled breeds and hairy breeds retain their vigour in fairly tropical conditions. Until meat-exporting restrictions were put on Argentina, she was making progress in the export of mutton and lamb carcasses, and can rapidly expand in this business should a favourable opportunity offer.

** Slaughter and Export of Sheep and Lambs in Argentina.*

Year.	Number Slaughtered.	Total Exported.	
		Frozen.	Chilled.
	No.	Tons.	Tons.
1928	5,914,486	73,388	—
1929	6,556,709	79,275	—
1930	7,349,207	79,093	237
1931	6,860,023	81,731	460
1932	6,767,051	69,515	348
1933†	7,028,044	61,173	475
1934†	—	47,726	165

* Cartilla Argentina.
† "Boletin Mensual de Estadistica Agropecuaria."
NOTE.—In translating the figures into English a tonelada was taken as 0.9842 ton.

The relative importance of sheep and lambs to Argentina from an export point of view is shown in the next table, where the numbers of carcasses sent overseas during the past three seasons are shown:—

**Sheep and Lamb Carcasses Exported from Argentina.*

Year.	Lamb Carcasses.	Sheep Carcasses.
	No.	No.
1932	3,551,445	834,373
1933	3,507,957	593,031
1934	3,034,314	472,426

* "Boletin Mensual de Estadistica Agropecuaria."

Besides the carcasses of mutton and lamb exported, the quantity of wool and sheepskins sent overseas reaches considerable dimensions, as can be seen in the following table:—

** Wool and Sheepskins Exported from Argentina.*

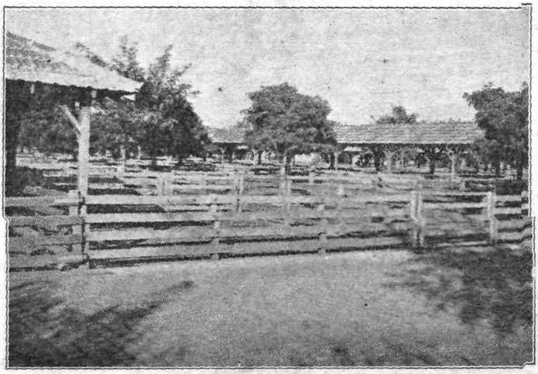
Year.	Wool.			Sheepskins.
	Greasy.	Scoured.	From Frigorificos.	
	Tons.	Tons.	Tons.	Tons.
1928	115,772	2,448	5,201	20,482
1929	118,303	2,622	6,002	19,831
1930	124,418	2,481	5,978	20,450
1931	127,787	2,726	7,993	21,272
1932	110,290	4,447	5,674	19,931
1933†	142,145	7,583	6,495	25,782
1933†	96,021	7,865	5,389	16,870

* Cartilla Argentina.
† Boletin Mensual de Estadistica Agropecuaria.
NOTE.—In translating the figures into English a tonelada was taken as 0.9842 ton.

Slaughtering Sheep.

...ain system is in force for ...ving circular discs for

In all frigorificos slaughtering sheep for export the cha... point. A clip is the dressing of the carcasses. Some utilise the large revol... n to the circum- transferring the animals from the catching pens to the knifing ...ne end of the attached to one hind leg of a lamb or sheep and this is hooked o... l is carried ference of a large circular disc which is slowly revolving against o...ds, reaches pen holding the animals to be killed, with the result that the anima... up on up and forwards right out of the pen, and as it is hanging head downwar... hich the killer in a convenient position to be knifed. From the disc it is picked ... the slowly travelling chain and passes along the line of butchers to be dressed for market. The operations in dressing the carcasses are very similar in all places where the chain system is in use, as in New Zealand, where it is general, and in some parts of Australia. Whatever advantages the chain system of dressing sheep has over the individual method as regards speed of dressing, lesser damage to skins, and the utilisation of relatively unskilled labour, probably the greatest advantage of this system, where export carcasses are concerned, is that the carcasses are not marked during disembowelling with irremovable stains due to being handled



Sheep Sale Yards of Buenos Aires. It was found necessary to remove the sheep sale yards of Buenos Aires to another site a few years ago, and when this was done protection was provided for human beings by tiled roofs over all roadways, and a tree was planted in every sheep pen to ensure shade for the animals.

by men who have been displacing skins carrying dirty wool. Further, because the disembowelling is done at a central point, the inspection of the internal organs so very essential where export carcasses are concerned is facilitated to a very great degree, and leads to the more ready detection of disease.

At the frigorificos where sheep are killed for export the same close inspection as is given to beef is carried out, all important glands being exposed and cut.

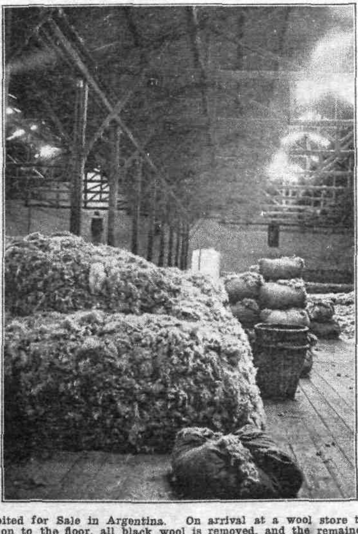
Buenos Aires Sheep Saleyards.

Fairly recently new saleyards for sheep were erected on a fresh site on the outskirts of Buenos Aires, and they form a convenient and satisfactory set of yards for the handling of large numbers of sheep. The drafting yards are on the outside of the main yards and convenient to the railway sidings. The yards and

roadways are well graded and nicely paved, and every open-way between the yards is covered by a tiled roof running its full length. All yards throughout the whole area are shaded in summer by deciduous trees, which are now just old enough to be useful for the purpose for which they were planted, but they will become increasingly valuable as they get larger. Several large weighbridges are provided at convenient spots in the saleyards to facilitate the weighing of the animals, all of which are sold by liveweight. Dogs are not allowed in the saleyards, nor are whips employed; but the movements of sheep into the yards or from pen to pen is helped by decoy sheep led by youths on pieces of rope, and by drivers with bells and rattles.

Selling Wool in Argentina.

Wool is sold in a very different manner in Argentina than is usual in Australia and New Zealand, although this year an attempt was made to introduce the sale by public auction with catalogue at Buenos Aires, but without much

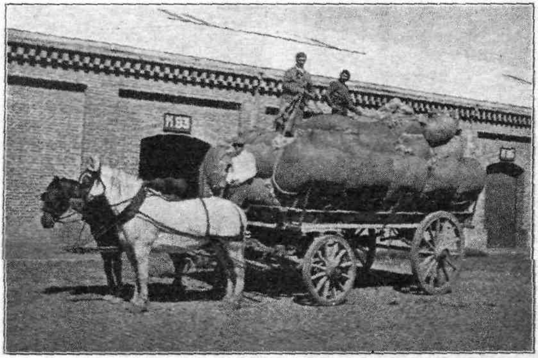


Wool Exhibited for Sale in Argentina. On arrival at a wool store the wool is tipped on to the floor, all black wool is removed, and the remainder is then tidily stacked. Wool buyers negotiate with sellers as to price, and when a purchase has been completed the wool is re-parcelled and carted to the wool-sorting and wool-baling store of the buyer.

success. At one sale only about 15 people attended, and almost every line offered was passed without a bid, and the few lines in which buyers were interested were knocked down without competition.

Most wool which is classed on the estancias is sent to England for sale, but the remainder which is not classed in any way is sent by growers to the wool stores in packages of all kinds, from bag size to bales, the covering in most cases being hessian, and frequently the consignments were poorly protected. More often

than not the wool is just bundled into the packages, but in some cases the fleeces are rolled before sending to market. The woolbroker receives the consignment and removes it from the original packages and stacks the wool on the floor of his selling warehouse, as a rule removing beforehand black wool and badly stained pieces, and if instructed removes extreme types. Some of the stacks reach dimensions of 25ft. x 12ft. x 7ft. in height, and although all sorts of wool are to be found in the stacks, a nice tidy job is generally made of the stacks, and most of them have slightly sloping sides and ends, so that the top area is a bit smaller than the bottom. The wool is sold privately, the wool stores being open every morning for buyers and every afternoon for receiving and stacking consignments. A representative of the woolbroker is in attendance at all times to receive and sell wool. When wool is purchased it is reparcelled and carted to the Barraca (wool-classing and baling store) of the buyer, where it is carefully classed, and that required for shipment is baled, whilst the unsuitable types are sold at the Barraca. The woolbuyers do their purchasing in the mornings



Carting Wool from the Wool Store to Barraca, i.e., Wool-sorting and Wool-baling Store. On arrival at Barraca the wool is classed, and that portion required by the buyer is baled and forwarded to his principals in England, Germany, France, &c., while the unwanted remainder is again sold in Argentina.

and classing in the afternoons. Sheepskins and hides are sold in the same stores and in a similar manner. This method of selling wool is hardly likely to favour the producer, but must be of considerable advantage to the buying firm, because an expert of this firm classes the wool to suit its requirements, and a lot of unsuitable wool is not shipped to the firm's manufacturing premises.

Most of the long-woolled sheep, whether pure-bred or crossbred, are shorn twice a year, the one clip being of about seven months' growth and known as three-quarter wool, and the other of about five months and known as half-wool. These types appear to suit important European interests better than allowing the full 12 months' growth.

PIGS IN ARGENTINA.

Pigs have rapidly become important in Argentina as livestock producing meat for export, and would have been still more prominent than they are if it had not

been for the meat quota restrictions of Great Britain. As it is, the census of 1930 disclosed 3,768,738 pigs, the most of which, as with other forms of farm livestock, were found in the best agricultural districts of the country, as follows:—

Province of Buenos Aires	1,838,494
Province of Santa Fé	542,940
Province of Córdoba	513,528
Territory of La Pampa	114,553
Province of Santiago del Estero	109,762
Other Districts	649,461
Total for Argentina	3,768,738

That pigs have rapidly become important from an export point of view is to be seen in the following table, where total slaughterings and the export of pig-meat are shown for recent years:—

**Export of Pig Products from Argentina.*

Year.	Total Slaughtered.	Exports.		
		Frozen Pork.	Hams.	Bacon.
	No.	Tons.	Tons.	Tons.
1928	815,050	3,797	26	77
1929	933,649	4,809	35	25
1930	910,151	4,754	19	14
1931	933,466	5,195	77	39
1932	1,003,175	6,415	1,838	784
1933†	1,242,385	9,097	2,622	578
1934†	—	14,825	2,262	295

* Cartilla Argentina.

† Boletin Mensual de Estadistica Agropecuaria.

NOTE.—In translating the figures into English a tonelada was taken as 0.9842 ton.

The above table does not show the full value of the pig to Argentina from an export point of view, as for instance in 1934 there were also exported 2,939 tons of pig-product manufactures valued at about one-quarter of the value of the frozen pork, 2,820 tons of lard worth about one-tenth of the frozen pork, 2,563 tons of pickled pork worth about one-seventh of the value of the frozen pork, and a little chilled pork and a few tons of pig skins.

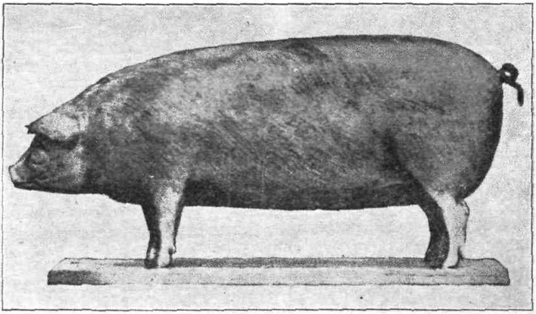
In connection with the use of pork as a foodstuff an interesting case of the development of a people's taste has occurred in Argentina. Of recent years large numbers of Italians have migrated to the country, and the frigorificos commenced making "Salami" for these immigrants. "Salami" consists very largely of sausage meat of pork and pig fat, and is highly seasoned with garlic, put in casings of various sizes, tightly bound round and round with cord, and instead of being cooked is stored in rooms kept at a regular temperature and regular moisture-content, and is matured in a manner somewhat similar to some cheeses, *i.e.*, by the development of a strong-growing mould on the outside of these huge sausages. The frigorificos started by making small quantities at the demand of the Italians, but the local people have taken so kindly to this foodstuff that all manufacturers are so pushed for space to mature it that they can hardly keep abreast of the demand, and hundreds and hundreds of tons are now being consumed annually.

It is impossible to estimate what proportions the export of pig products would have reached but for the meat quota, for when the restrictions were put on, many of the principal pig-breeders of the country, the members of the Pig-breeders' Association of Argentina, voluntarily reduced their herds, in some cases disposing of half of their breeding animals.

The Breeds of Pigs.

All of the well-known breeds of pigs are represented in Argentina, but the Duroc Jersey predominates, with the Berkshire prominent, Middle White in the cooler districts, and about half a million Poland China pigs.

No matter what the breed of pigs being kept by anyone in Argentina every effort is being made to bring it to a type suitable for present-day requirements, and the progress made in this direction is really remarkable, and is wholly due to the fact that a very strong Pig-breeders' Association exists in the country. This organisation, with one of the world's greatest pig experts at its head as President (Sr. Juan C. Campion), is sufficiently strong to control the pig industry of Argentina, and as soon as it was realised that a change had come in the type of pig carcass required by the only important market in the world, that of Great Britain, this Association got to work to meet the market. The change needed was very great, because the two principal breeds in the country—Duroc Jersey and Berkshire—were of a type almost directly opposite to that required, but the Association tackled the problem in a simple and very practical manner. A committee of thoroughly experienced pig-raisers was formed, and from charts showing the market value of the various cuts of the carcass, built up a theoretically ideal pig for present-day requirements. An artist was then engaged to sketch this pig,



Silver Model of the Theoretically Ideal Pig for Present-day Requirements. This model is taken as the standard of type for all pure-bred pigs in Argentina, no matter what the breed. Constant reference to this model by judges has resulted in a complete change from the over-fat type of a few years ago to the relatively lean, long, deep, fine-shouldered pig desired by the British market

and from the diagrams a model of a pig about 2ft. in length was made of silver by a London firm of jewellers. This model is taken as the standard of type for all pure-bred pigs in Argentina, no matter what the breed, and at the principal agricultural shows this model is put before the pig judges before they commence inspecting the exhibits. To ensure that the ideal is not lost sight of, the trophy for the principal awards at Pig Shows consists of a silver replica of the standard model, about 6in. in length. All breed societies did not fall in immediately with the Association's arrangements, but even the Berkshire Pig Society has now come into line and is making great efforts to catch up leeway.

The Duroc Jersey of Argentina has been described as a Large White with red hair, but that is hardly a correct definition, for the breed characteristics are quite distinct, but they have been so altered from the old type that they are now of a build almost ideal for the British market. They are long, fairly high animals,

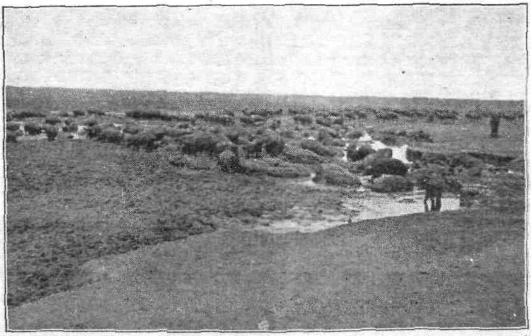
with fine bone and shoulders, deep sides, with fair hams and strongly roach-backed, and having retained their noted hardiness and resistance to disease are almost ideal for the method of handling pigs as practised in Argentina.

Even though Berkshire breeders would not go so far towards changing type as the breeders of other kinds, they were making the change gradually, and large numbers of Berkshires were seen of the new American type which has become known as the Canadian Berkshire in New Zealand and Australia.

Poland China pigs, which are not popular in Australia, have also been fully transformed in Argentina and now fulfil market requirements as the old type of this breed never could.

Managing Pigs on a Large Scale.

The principal breeders of pigs in Argentina are located in the Maize belt and raise pigs by thousands in the open without fixed sties, and for the purpose the Duroc Jersey breed is admirably fitted. At one place visited—"Santa Juana," one of the estancias of His Excellency the Minister of Agriculture, the Hon. Luis Duhau—2,500 Duroc Jersey sows of fine-boned, fine-haired type are maintained, and 18,000 to 20,000 pigs, weighing 220lbs. live-weight, are sold each year. The farrowing fields are about 24 acres in extent, and are always located where there

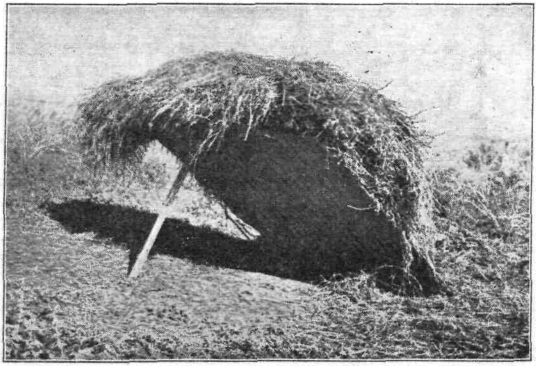


Extensive Mud Bath for Pigs, as commonly seen in Argentina. An essential feature of the rearing of pigs in the open in Argentina is the provision of mud baths, in which the pigs can wallow at will. The water is maintained in most of the mud baths by allowing windmills to pump water from wells the whole time, the water being allowed to run straight on the ground.

is a good stand of Lucerne. In each field 30 sows, which are to farrow as nearly as possible on the same day, are placed. A simple shelter is supplied for each sow, consisting of a galvanized iron sheet 10ft. long by 4ft. wide, one end of which is pushed a few inches into the ground and the other carries a hinged frame which supports that end about 2ft. 6in. above ground level. The three open sides are surrounded by a heavy wooden frame about 10in. in height. The sow farrows under the shelter, and although the wooden frame does not interfere with the movements of the sow it is high enough to prevent the youngsters leaving the shelters until they have grown somewhat. A large mud pool is maintained in each farrowing field by keeping the windmill working most of the time when there is sufficient wind for the purpose. The Lucerne fields are so managed that young sappy growth of Lucerne is available during the spring farrowing period, and for

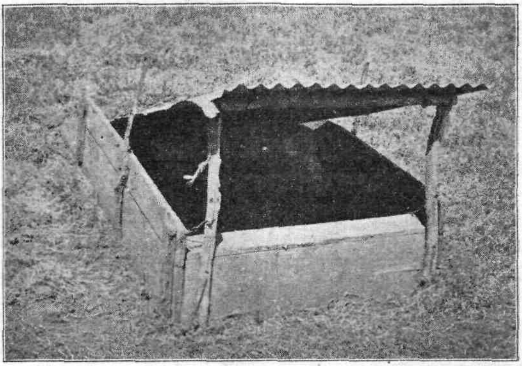
the autumn farrowing Barley is drilled into the Lucerne fields. The young pigs are weaned on to good green feed and are fed maize as well, but when preparing them for market mobs of 1,000 to 3,000 slips are turned into crops of standing Maize to harvest their own grain, having the run of a Lucerne field at the same time. Wherever the pigs might be, mud pools are always available in which the animals can wallow when they desire.

At "El Trio," belonging to the President of the Pig-breeders' Association of Argentina, Sr. Juan C. Campion, 2,000 breeding sows of the Duroc Jersey breed, and essentially of good modern type, are kept for the production of market pigs. At farrowing time the sows are separated into lots of 20 to a field of Lucerne, in which are provided 20 shelters consisting of three sheets of 6ft. corrugated iron joined together lengthways with bolts, and with channel iron closed on both top and bottom. This 6ft. by 6ft. sheet is maintained at an angle of about 30 degrees

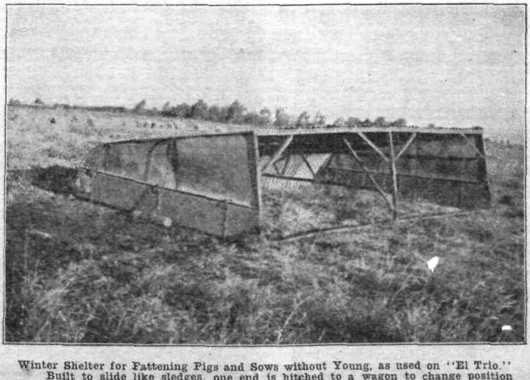


Type of Pig Shelter used for Farrowing Sows on "El Trio." This shelter consists of three 6ft. sheets of galvanized iron rivetted together and held in position on a peg driven into the ground a few inches. For coolness in hot weather the shelter is covered with lucerne hay or some such material.

to the ground by letting one end into the ground a few inches and supporting the other end on a peg driven into the soil, to which it is wired. No attempt is made to keep the pigs of each sow separate, but the youngsters of the whole 20 sows mix together as soon as they are able to walk about. In cool weather the iron is left bare, but when hot the sheet is covered about 6in. deep with old Lucerne hay. In summer the open side of the shelter is faced away from the sun, but in autumn and spring is turned around to allow the sun to shine on the sow. In winter, for fattening pigs and for sows without young, different shelters are used, consisting of light iron frames about 8ft. to 14ft. in length and 8ft. wide, covered with galvanized iron. These shelters are more or less wedge-shaped, the back being about 10in. high and the front about 4ft. The ends are closed in except for the bottom 9in., over which hinged flaps are dropped in cold weather, but they are opened up to admit of a flow of air should the weather become hot. These shelters are built to slide like sledges, and provision is made to hitch one d to a waggon to change position in the field.



Type of Pig Shelter used for Farrowing Sows on "Santa Juana." Two 10ft. sheets of galvanised iron are rivetted together and held in position by a *frame-work hinged to one end. The three open sides are surrounded by a* heavy wooden frame, about 10in. in height, which does not hinder the movements of the sow, but prevents the youngsters leaving the shelters until some days old.



Winter Shelter for Fattening Pigs and Sows without Young, as used on "El Trio." Built to slide like sledges, one end is hitched to a wagon to change position in a *field, which is done frequently.*

planted were true to label, the One-leaved Cape Tulip was evidently grown, under the name *Bobartia aurantiaca*, Sweet, in the Botanical Gardens, Adelaide, as early as 1859, which is the date of issue of the first catalogue of plants under cultivation there; and it may have been introduced earlier than this. In this first catalogue, compiled by the late Mr. G. W. Francis, there are listed, also, *Homeria edulis*, Vent., and *Homeria longifolia* (?). In the subsequent catalogues issued by the late Dr. Schomburgk, in 1871 and 1879, respectively, neither of these names appear; but, under *Homeria*, we find listed *H. collina*, Vent., and under *Bobartia*, again, *B. aurantiaca*, Sweet. While the identity of the plants referred to in the first catalogue as *Homeria edulis* and *Homeria longifolia*, respectively, remains uncertain, the suggestion is here made that the *Bobartia aurantiaca* of all three catalogues was identical with our present One-leaved Tulip, and that the *Homeria collina* of the two later catalogues may have been the yellow-flowered variety, formerly regarded as the type of *H. collina*, but subsequently distinguished by J. G. Baker as the variety *ochroleuca*. Baker's *Handbook of Irideae* was published in 1892, and the description, by that author, of the *Iridaceae* in the *Flora Capensis* appeared in 1896-7; both publications were thus issued only *after* attention had been drawn, in this country, to the potentialities of Cape Tulip as a poison weed. According to Baker (*Flora Capensis*), the type of *Homeria collina* has flowers of a deep red colour, and the species presents three varietal forms; namely, a variety *aurantiaca* (= *Bobartia aurantiaca*, Sweet), the variety *ochroleuca* with yellow flowers, already mentioned, and a third variety, *bicolor*, in which the flowers are yellow with a lavender throat. The first of these differs from the type, not only in the colour of the flowers, which are of a lighter, more orange, red, but also in having narrower, and more pointed perianth segments, each of which has a yellow base or claw. This is the plant figured in *Curtis' Botanical Magazine* (T.1612) under the name *Moraea collina* var. *miniata-minor*, and it is undoubtedly the same as our One-leaved Cape Tulip. There seems little doubt that this plant escaped from cultivation in various places during the years following its introduction. The following extract from the *Garden and Field* of November, 1903, is of interest in this connection, and it illustrates the confusion between the two species of Tulip:—

"The 'Cape Tulip' is a variety of *Homeria collina* . . . described in the old books as *Moraea* and as *Bobartia aurantiaca*. It is like the sparaxis, oxalis, and many other well-known bulbs, a native of the Cape of Good Hope, and is esteemed in Europe as a greenhouse bulb, being quoted in the catalogues at 2s. 6d. per 100, or 1d. per bulb.

"The varieties of *Homeria* (yellow and orange to orange-red) not infrequently seen in our gardens this season, and *the strayed representatives of the same which are spreading in the hills districts, do not appear to multiply as rapidly as the one photographed.*"

I have placed the last part of this in italics because, as the illustration accompanying the article shows, the *one photographed* is the Two-leaved Tulip (*Homeria miniata*), whereas the *strayed representatives* referred to are, presumably, one-leaved forms (*H. collina*). Owing to the very numerous cormils formed by the first, its power of vegetative multiplication is much greater than that of the second, and it forms much denser infestations. But whether it spreads more rapidly than the one-leaved species is, however, doubtful, since it may not be as efficient as the latter as regards the formation, dispersal, and germination of the seeds.

Owing to the confusion between the two forms the mode of introduction of *Homeria miniata* is obscure, though probably both were introduced together and sold as *Bobartia aurantiaca*, and later as *Homeria collina*. Loudon's *Encyclopaedia of Plants* gives the date of introduction, into Britain, of *H. miniata* (Figure 17692, p. 1233) as 1825, as against 1768 for *Moraea* (*i.e.*, *Homeria*) *collina*

(Figure 807, p. 47). Though described as separate species by Sweet (*British Flower Garden*) early in the 19th century, *Homeria miniata* has, until comparatively recent times, been regarded by most authorities as a variety of *H. collina*, with which it is still listed as conspecific in the *Index Kewensis*. Since the specific name *collina* has been applied to both plants, it is often impossible to ascertain from the early records which of the two forms is the one referred to. The confusion has been all the more natural in this country owing to the close similarity between the two as regards flower colour.

The first descriptive account of Cape Tulip to appear in this *Journal* was written by Mr. W. L. Summers, in 1903, with the following opening remarks:—

"*Early in the history of the Agricultural Bureau, about the beginning of 1889*, I believe, attention was directed to the presence of an imported bulbous plant near Myponga, where it was reputed to have caused the death of some cattle. This plant was identified by the late Dr. Schomburgk as *Bobartia aurantiaca*, a native of Cape Colony, and where it bore a well-proved reputation of being poisonous to stock. Later on the name was given by the late Baron von Mueller as *Homeria sp.*, probably *H. lineata*. Subsequently specimens were submitted from Victoria to the Government Botanist, Cape Colony, who reported to Baron von Mueller, in connection with reputed cases of cattle poisoning at Pascoe Vale, near Melbourne, in 1892, that the plant was the red-flowered variety of *Homeria collina* * (*the ordinary form of which bears flowers of a sulphur yellow colour*), and that it was undoubtedly poisonous. In 1893 a bulletin was issued by the Victorian Agricultural Department concerning the poisonous nature of this weed, *leaving but little doubt that it was the agent responsible for the deaths* of nearly 20 head of cattle in one paddock in the course of a few days."

The illustration accompanying Mr. Summers' article is of the Two-leaved Tulip (*H. miniata*), and was reproduced from the Victorian bulletin referred to, thus indicating the identity of the Victorian plants. But it is not clear that the South Australian plants submitted to the late Dr. Schomburgk, and identified by him as *Bobartia aurantiaca* were necessarily the same. From the localities given by Mr. J. M. Black in the *Flora of South Australia*, namely, "Pasture in southern districts and South-East" for *H. collina*, as against "Adelaide Plains and Mount Lofty Range" for *H. miniata*, it would appear more likely that they were of the one-leaved type, though both species were undoubtedly then present in this State. In the *Journal of the Bureau of Agriculture* of Western Australia for December, 1894, a brief account was given of the Two-leaved Tulip under the name *H. lineata*. In the *Agricultural Gazette* of New South Wales for February, 1904, the late Mr. J. H. Maiden recorded *H. collina* from Penrith, New South Wales. Thus, whatever may have been the original date of introduction of the Cape Tulip into Australia, it is evident that one or both species were established as weeds in Victoria, South Australia, and Western Australia, during the early nineties, and appeared in New South Wales not long afterwards. While the Two-leaved Tulip seems to have been the one first noticed in Victoria and Western Australia, and doubtless occurred in South Australia at that time, the one-leaved plant may have been the one whose poisonous properties were first suspected in this State.

While the two forms are much alike in certain respects, a comparison of the two coloured plates† will show that there are marked differences between them, not only as regards the number of leaves, the presence or absence of cormils, and the size and number of the flowers, but also in the detailed structure of the latter, and especially of the style branches. These differences are so very striking that it is difficult to accept any other view than that the two plants are specifically quite distinct.

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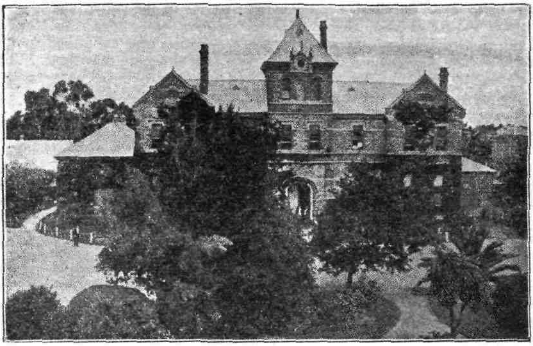
*The italics are mine. The "ordinary form" referred to is the variety *ochroleuca* of Baker. *Vide* my remarks above concerning the date of publication of J. G. Baker's *Handbook of Irideae*.

†The second part of this article, together with an illustration in colour of the One-[leaved] Tulip (*Homeria collina*) will appear in the next issue of this *Journal*.



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ROSEWORTHY.

Botanical Name.—The name *Homeria,* it is generally agreed, comes from *homereo,* "to meet," in allusion to the united stamens of the flower, and is not in honour of the Greek poet, Homer, as has sometimes been stated. In *Homeria,* and also in certain other genera, the filaments of the stamens are joined together to form a tube surrounding the filiform style of the flower, the three anthers being sessile at the top of this tube, with their pollen sacs directed outwards, and their backs in contact with the petaloid branches of the style. *Collina* means "pertaining to a small hill" and, therefore, "growing on low hills"; the one-leaved plant does seem to prefer hilly country, *e.g.,* Clare, Mount Pleasant, Tweedvale, Highbury, Glenunga, &c., whereas most of the writer's specimens of the two-leaved species have been collected on flat country, *e.g.,* Roseworthy, Freeling, Gawler, Adelaide Parklands, &c. *Miniata* means "coloured like cinnabar or red lead" and refers, of course, to the flowers, which, in many specimens of both species, are very nearly this shade, though the yellow bases of the perianth segments gives a more orange effect to the colour of the flower as a whole.

The Family.—*Homeria* belongs to the *Iridaceae,* a family of some 800 species of mostly perennial herbs with two-ranked, equitant, leaves, and growing from underground rhizomes or corms, and sometimes from bulbs. The difference between a corm and a bulb is, of course, that the first is a solid structure enclosed within thin scale-like leaves, whereas the second, *e.g.,* an onion, is composed mainly of thick fleshy leaves, the outer leaves alone being thin and scale-like. The family has a wide distribution, but is especially well developed in South Africa and tropical America. It differs from the *Liliaceae,* to which belongs the Wild Onion (*Asphodelus fistulosus*), chiefly in the inferior position of the ovary of the flower, and in the absence of an inner whorl of stamens. The Iridaceous flower thus consists, typically, of two perianth whorls of three segments each (usually united below to form a tube of varying length), a single whorl of stamens corresponding in number and position with the outer perianth segments, and a whorl of three united and inferior carpels, the ovary ripening to form a capsular fruit with usually numerous seeds. The ovary is continuous above with a style, which terminates in three branches. The style branches are often petaloid, sometimes, *e.g.,* in *Iris,* markedly so.

The Genus.—The characters which distinguish *Homeria* from other genera of *Iridaceae* are (1) the almost complete absence of a perianth tube, (2) the union of the staminal filaments to form a tube surrounding the style, (3) the linear sessile anthers placed opposite the style branches, (4) the detailed structure of the style branches, and (5) the inferior club-shaped ovary and resulting fruit, which is not enclosed in the spathe valves and opens at the apex only.

The number of species of *Homeria* recognised by different authorities varies considerably. Bentham (*Genera Plantarum*) gave 5, and the *Index Kewensis* originally listed 4 species; Marloth (1915) gives 6, Thonner (1915) 12, Phillips (1926) 15, Willis (1931) 8. During the past 15 years a number of new species have been described, chiefly by L. Bolus (*Ann. Bolus Herb.*), and by N. E. Brown in the *Transactions of the Royal Society of South Africa.* Most of these have been included in the later supplements to the *Index Kewensis,* according to which the total number is now 25, and one or two have been described since then. Evidently the genus is in need of revision. In the *Flowering Plants of South Africa,* a publication similar in pattern to the *Botanical Magazine* and beautifully illustrated with coloured plates, the Editor, Dr. I. B. Pole Evans, C.M.G., remarks in the course of a description of *H. Cookii* that "*Homeria* has not received the attention it deserves from the systematist, and until recently has been studied chiefly from dried material where, owing to the fugacious nature of the perianth and stigmas, floral characters have scarcely been used."

BOTANICAL DESCRIPTIONS (from *Flora Capensis*).

(1) ***Homeria miniata***, Sweet. Corm globose, with thick rigid black cancellate tunics; produced leaves 2, linear, rigid in texture, overlapping the stem, without a white central band, *sometimes with bulbillae (cormils) in their axils; stem ½-1½ft. long; clusters* several, on short erect peduncles; spathes cylindrical, 1½-2in. long, the valves green and firm, except the long scariose tip; perianth fulvous, ¾-1in. long, the segments subequal, oblanceolate, ¼in. broad, obtuse; stamens half as long as the perianth; anthers much shorter than the column of filaments; ovary clavate, trigonous, ½in. long. In flower—Sept. and Oct.

(2) ***Homeria collina***, Vent. Corm globose, ¾-1in. diameter, with thick, dark brown, cancellate tunics; produced leaf 1, linear, rigid in texture, strongly ribbed, glabrous, 1½-2ft. long, ¼-½in. broad; stem 1-1½ft. long, with 1-4 clusters, the side ones on short erect peduncles, and several lanceolate, sheathing rudimentary leaves of firm texture; spathes cylindrical, 2-3-flowered, 2½-3in. long, valves cuspidate, firm in texture, except the tip, *closely ribbed; perianth limb bright red, 1¼-1½in. long, the segments oblanceolate*-oblong, obtuse, ⅝-1in. broad, with a yellow throat inside; stamens ½-⅝in. long, the anthers as long as the tube of filaments; ovary clavate, ¾-1in. long; style crests minute, subquadrate; capsule clavate, an inch long.

Var. *aurantiaca* (Sweet). Habit more slender; leaf narrower; segments of perianth light scarlet, with a yellow claw, narrower and more acute. In flower—Aug. to Nov.

(To be continued.)

HAND-REARING OF MOTHERLESS FOAL.

Replying to a member of the Boor's Plains Branch of the Agricultural Bureau, who asked for the best method of hand-rearing a motherless foal, Mr. C. McKenna, B.V.Sc., M.R.C.V.S. (Government Veterinary Officer of the Stock and Brands Department), says:—The foal may be put to a foster mother if available; otherwise choose the milk from a cow (one with a low fat test). Note: If foal has not suckled mother, give ½oz. castor oil and if necessary an enema 12 hours later. Dissolve 1 tablespoon of sugar in a little warm water and add 3-5 tablespoons of limewater and enough milk to make a pint. Warm this to blood heat and give ¼ of a pint every hour for the first few days, using a baby's feeding bottle with a large nipple. Then six (6) feeds daily of 1-1½ pints each feed. At 3-4 weeks old the sugar may be left out, but the limewater continued. Give four feeds daily of 1½ quarts per feed. In 5-6 weeks skim milk may be gradually substituted for whole milk and after 3 months the colt may be given all it can drink 3 times a day. Scrupulous cleanliness of utensils used for feeding must be observed, all vessels being rinsed out with cold water immediately after use and scalded subsequently. It is very advisable to provide a companion for an orphan foal reared by hand. Probably a young calf is best, although a quiet old ewe will serve instead. Supply oatmeal, crushed oats, bran and hay when it can nibble. If scouring, stop milk for 2-3 meals and give sweetened water and limewater and also 2-4 tablespoons of equal parts of castor oil and olive oil.

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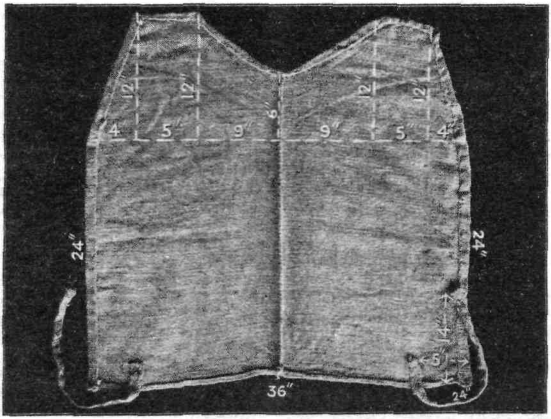
THE RUGGING OF SHEEP FOR WOOL IMPROVEMENT.

[By R. C. Scott, Supervisor of Experimental Work.]

In South Australia, upwards of 60,000 bales of inferior wool are offered for sale each year, and the chief causes of damage are dust and dirt. For such material there is very little demand, and the wool brokers are glad to clear it at almost any price which is offered. Naturally, this represents a very serious loss to the State, since 60,000 bales constitute from 25 per cent. to 30 per cent. of our total clip, and, assuming that the value is reduced by 50 per cent. compared with that which it would command if clean, the loss to producers is approximately £350,000 annually.



Rug made from a Used Cornsack, showing the dimensions required to fit a Merino Ewe of average size.

In addition, it can be claimed that if less wool of this class was submitted at the Adelaide wool sales, the good name of these sales would be much improved, and more buyers encouraged to attend, a fact which would be to the advantage of sellers.

Anything that can be done, therefore, to prevent the introduction of dirt into the fleeces of South Australian sheep is of considerable importance, not only to owners themselves, but also to the State as a whole, since it will add to the general wealth of the community.

As 70 per cent. of our sheep are held within Goyder's line of rainfall, there are large numbers carried on farming areas where, at certain periods of the year, they run on fallow ground, resulting in the wool becoming impregnated with dirt.

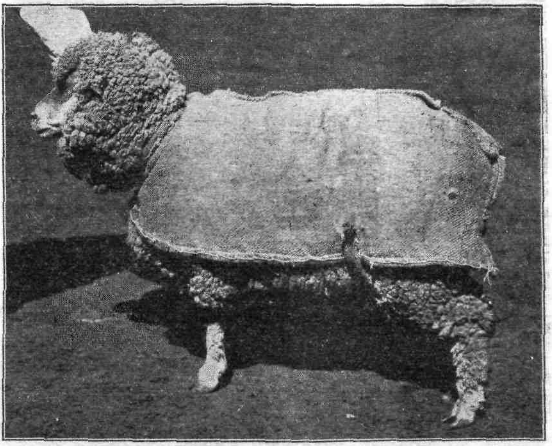
Further, there are many districts where the soil tends to drift; dust storms occur frequently, and the fleece, particularly that on the back of the animals, becomes heavily laden with sand. The wool loses its attractive appearance, is depreciated in value, and does not suit the requirements of our overseas buyers.

In an effort to keep the wool clean, and free from dirt, rugging has been resorted to, and whilst such method must be regarded as still being more or less in the experimental stages, the results obtained have been most encouraging, and allow the recommendation that sheep owners should test it out for themselves in the coming year.

Consequently, although it is not yet possible to submit definite conclusions, the following particulars indicate the origin of the idea, the method of rugging, and the results secured.

THE ORIGIN OF RUGGING.

The credit for the idea of rugging sheep for wool improvement in farm flocks must be given to Mr. Spen. Williams, Manager of the Wool Department of Goldsbrough, Mort & Co., Ltd., in Adelaide. The fact that so much poor type farmer's wool was appearing at the Adelaide sales had been exercising Mr. Williams' mind for a long time, and when attention was drawn to the improvement in the wool of a decoy sheep at Port Adelaide, following rugging, he quickly realised the possibilities of the idea.



Rugged Sheep—Side View.

This decoy was a black-faced animal of no particular breed, held at Port Adelaide for use as a leader when trucking or shipping sheep. He ran in sandy stable yards, and, consequently, the fleece was practically valueless because of the sand and dust with which it was filled. However, on one occasion a light hessian bag rug was placed on the animal, and a remarkable improvement in the cleanliness of the wool resulted. Mr. Williams concluded that if such improvement could be effected with a sheep of this class, the subject of rugging was worthy of further investigation with animals of better type. Accordingly, a few sheep were rugged on the property of Mr. A. P. Anderson, of Halbury, in 1934, and about 70 Merino ewes treated at the Turretfield Seed Wheat Farm towards the middle of January of this year.

RESULTS OF WHEAT CROP COMPETITIONS—*continued.*

Position.	Name and Address of Competitor.	Variety.	Apparent Yield.	Freedom from Weeds.	Freedom from Disease.	Trueness to Type.	Evenness of Crop.	Total.
		Maxima—	35	25	20	15	5	100

SOUTHERN YORKE PENINSULA.

Judged by R. Hill, District Agricultural Instructor.

Position.	Name and Address of Competitor.	Variety.	Apparent Yield.	Freedom from Weeds.	Freedom from Disease.	Trueness to Type.	Evenness of Crop.	Total.
1	N. H. Boundy, Minlaton	Ford	35	22	18	14	4	93
2	W. S. Watters, Curramulka	Sword	34	22	20	12	4	92
3	A. J. Short, Curramulka	Bobin	35	21	17	14	4½	91½
4	O. H. Bittner, Curramulka	Sword, Daphne, and Bencubbin	34	22	18	12½	4½	91
5	W. H. and J. Alderman, Minlaton No. 1	Ford and Sword	32	23	17	13½	4½	90
6	W. L. Boundy, Minlaton	Waratah ...	35	19	18	13	4	89
7	H. Polkinghorne, Minlaton	Sword	30	20	20	14½	4	88½
8	W. H. and J. Alderman, Minlaton No. 2	Ford and Sword	30	22½	17	14	4½	88
8	W. S. Watters, Curramulka	Waratah ...	29	23	18	13½	4½	88
10	W. H. and J. Alderman, Minlaton No. 3	Ford	26	23	16	14	4	83
11	Frank H. Tonkin, Minlaton	Daphne	24	21	19	12	4	80

MID YORKE PENINSULA.

Judged by R. Hill, District Agricultural Instructor.

Position.	Name and Address of Competitor.	Variety.	Apparent Yield.	Freedom from Weeds.	Freedom from Disease.	Trueness to Type.	Evenness of Crop.	Total.
1	S. W. A. Heinrich, Maitland	Geeralying and Sword	34	21	20	14	4½	93½
2	J. S. Henderson, Maitland	Ford	32	21	20	13	4	90
3	V. A. Dutschke, Ardrossan	Ford	30	21	19	13	4	87
4	J. S. Henderson, Maitland	Sword	31	19	20	13	3½	86½
5	R. J. T. Dutschke, Maitland	Ranee	30	20	18	12	4¾	84¾
6	E. F. Heinrich, South Kilkerran	Dan	26	20	19	13½	4½	83
6	H. O. Linke, South Kilkerran	Sword and Ford	25	23½	16	14	4½	83
8	G. Bittner, South Kilkerran	Sword and Ford	25	23½	16	14	4	82½
9	O. H. Heinrich, South Kilkerran	Ford	23	22	18	14½	3½	81
10	O. B. Linke, South Kilkerran	—	21	22	18½	14½	3½	79½
11	J. C. A. Arnold, South Kilkerran	Ranee and Sword	25	22½	15	12	4¾	79¼
12	P. C. J. Marschall, South Kilkerran	Sword	21	22	18	14	3¼	78¼
13	W. A. Heinrich, South Kilkerran	Ranee	22	21	16	14	4	77
14	R. E. Hasting, South Kilkerran	Ranee	23	17	17	11	3	71

AGRICULTURE IN THE TEMPERATE AND SUB-TROPICAL CLIMATES OF THE SOUTH.

[A Report by the Deputy Director of Agriculture (W. J. Spafford) to His Excellency Sir Winston Dugan, K.C.M.G., C.B., D.S.O., Governor in and over the State of South Australia and its Dependencies in the Commonwealth of Australia. Mr. Spafford took a brief tour of portions of the principal agricultural countries in the same climatic zones as the settled portions of Australia, in fulfilment of the appointment as Honorary Commissioner, conferred upon him by His Excellency, to inquire into and report upon the Production and Preparation for Marketing of Agricultural Products, including Crops and Livestock in South America, South Africa, and New Zealand.]*

SOUTH AFRICA.

(Continued from page 523.)

So much gold has been mined in South Africa and exported overseas for such a long time that there appears to have been a tendency in that country to neglect agricultural activities, at all events in so far as production for export is concerned, but although this may have been true in the past it is not so to-day, and very great interest is being shown, and heavy expenditure incurred, in making up leeway in this direction.

AGRICULTURAL CONDITIONS OF SOUTH AFRICA.

Although South Africa is never looked upon as one of the good agricultural countries of the world, and this largely because of the high proportion of stony country and the patchiness of the good soils, nevertheless, in the aggregate, it contains a fairly considerable area of country capable of high production.

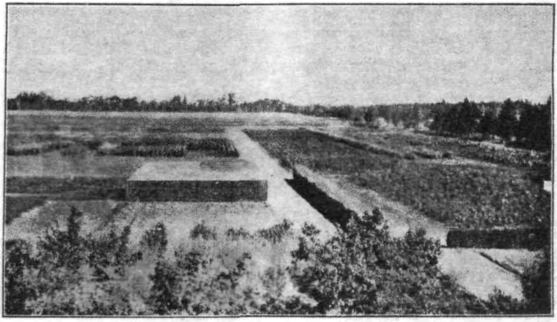
In a general way South Africa consists of plains from which rise great numbers of steep-sided, flat-topped, stony hills, the soil on the table-tops of the hills being in most cases shallow, but where sufficient rain is received are capable of growing grasses and herbs for the maintenance of fairly large numbers of livestock. On the plains themselves most of the soils are of greater depth, and in some cases of much better quality, and a good number of them are well suited for crop growing. In the more prominent valleys and alongside the rivers first-class agricultural soils are met with, and in these places, fruits, vegetables, and pastures are produced quite well. South Africa's agriculture appears to be limited by the incidence of the rainfall, rather than by the total amount received, or by the quality of the soils, for in many localities large areas of really fertile soils are built up, and then over a period of years rains of a torrential nature are experienced, which lead to the washing away of the soil. This soil erosion is so bad during some periods of time that nearly all of the loose earthy material which has taken such a very long time to form the deposits of some of the valleys is removed, and what were once really good agricultural lands become barren wastes, with deep gorges having precipitous sides and banks of raw soils incapable of growing cultivated crops. Judged by present-day appearances this process has been going on for centuries in portions of South Africa, the soil particles, liberated when the rocks disintegrate, fill up the valleys, only to be washed away when torrential rains again become of frequent occurrence.

*Tour made in the company of Col. C. P. Butler ("Yattalunga," of the *Advertiser*).

A considerable amount of soil erosion is taking place at present, but the Government is making a strenuous effort to check the advance of the trouble wherever it is likely to prove worth while, and by the work undertaken is saving a vast area of good agricultural land which would otherwise, most assuredly, be washed away.

The Climate of South Africa.

The climate of South Africa varies from truly Mediterranean over a small area *at the south-west corner up to arid and almost desert across the north-west corner, and from the western side it passes through temperate conditions towards the east and north-east to reach tropical climate at the north, the uppermost boundary of the country being about 100 miles above the Tropic of Capricorn. The height of the country affects the climate, and considering that the southernmost point of South* Africa does not reach 35° S. latitude, and that the northern boundary is in the tropics, the climate is remarkably favourable, and appears wholly due to the fact that nearly all of the country is more than 3,000ft. above sea level, and so a temperate,



Experimental Plots of Field Crops at Potchefstroom School of Agriculture.

A great effort is being made by the Department of Agriculture of South Africa to develop crop-growing in various parts of the Union, and extensive experimental work is being carried out with all crops likely to prove suitable.

instead of a sub-tropical climate, is experienced over a vast stretch of territory. The presence of such a large extent of low-rainfall country on the west side accounts for the prevalence of hot winds and duststorms, which are of frequent occurrence. Although frosts during the winter season are not unusual in inland districts, snow does not occur very frequently.

The Rainfall.

The average annual rainfall varies between the fairly large area on the west which receives less than 5in., through all stages to a few scattered small spots where over 75in. are recorded per annum on the average. Not only is the range of rainfall great, but the variation in average fall comes very rapidly in the south-west and north-east corners of the country. This is particularly noticeable near
11 Table Mountain on which the average annual rainfall is 74¾in., whilst at its
12 P.d only about 6 miles in a horizontal distance, the quantity received is only
Sou. towards the north-east the annual recordings rapidly diminish until
13 W. A. h miles from the mountain less than 5in. constitute the annual rain-
Kilkerr
14 R. E. Hast
Kilkerran

About one-third of the whole country receives less than 10in. of average annual rainfall, and about one-quarter records over 25in. More than half of the Union receives above 15in. of average annual rainfall, but as practically the whole of the area served is in the summer rainfall zone, thunderstorms with hail are frequent, and instead of light, steady falls of rain it is not unusual to get 2in. of rain in a day, and occasionally 3in. to 4in. of rain fall in a few hours.

That much of South Africa receives its rain in the summer period is shown in the following table where the distribution of the rainfall of 30 recording stations, scattered fairly evenly over the country, is set out:—

Distribution of Rainfall in South Africa.

Station.	Location.		Above Sea Level.	Period of Records.	Average Annual Rainfall.	Distribution.			
	Long. E.	Lat. S.				Winter. June to Aug.	Spring. Sept. to Nov.	Summer. Dec. to Feb.	Autumn. March to May.
			Feet.	Years.	Inches.	%	%	%	%
okiep	17° 52′	29° 36′	3,036	44	6·90	43·3	17·4	10·3	29·0
alvinia	19° 46′	31° 29′	3,500	45	8·46	36·4	17·3	12·3	34·0
Vorcester	19° 26′	33° 39′	780	53	12·38	44·3	22·1	8·2	25·4
akamas	20° 36′	28° 46′	—	4	5·98	7·2	3·3	34·1	55·4
mandelboom	20° 55′	31° 21′	3,600	12	5·19	13·1	15·8	33·5	37·6
adismith	21° 17′	33° 29′	1,860	48	14·00	22·3	25·4	22·3	30·0
eaufort West	22° 36′	32° 21′	2,850	48	9·69	9·7	21·1	33·8	35·4
forokwen	23° 47′	26° 07′	4,000	17	12·29	4·4	18·6	44·0	33·0
uruman II.	23° 27′	27° 25′	4,500	18	16·36	3·5	12·2	53·3	31·0
riquatown	23° 15′	28° 51′	4,300	43	12·78	6·1	15·0	40·2	38·7
ritstown	23° 31′	30° 35′	3,685	39	11·47	7·7	16·5	33·5	42·3
imberley	24° 46′	28° 44′	4,042	41	15·86	5·0	19·5	43·1	32·4
eestekraal	*24° 45′*	*30° 55′*	*4,400*	*4*	*8·72*	9·5	32·8	28·6	29·1
raaff Reinet	24° 32′	32° 16′	2,460	64	14·32	11·1	25·2	33·0	30·7
chweizer Reneke	25° 15′	27° 08′	4,500	13	19·61	3·7	21·7	48·0	26·6
olesberg	25° 07′	30° 43′	4,470	49	15·72	8·2	18·7	37·7	35·4
eres	26° 55′	28° 51′	4,600	8	18·22	8·4	24·1	46·3	21·2
loemfontein	26° 12′	29° 07′	4,500	42	21·58	5·6	21·2	43·2	30·0
lice	26° 50′	32° 47′	1,720	41	22·58	12·2	25·6	53·1	29·1
roonstad	27° 14′	27° 40′	4,300	46	24·21	4·4	25·2	44·6	25·8
Senekal	27° 37′	*28° 19′*	*4,750*	21	25·29	3·7	26·9	45·1	24·3
Dordrecht	27° 02′	31° 24′	5,390	18	21·94	5·9	19·1	46·3	28·7
Vaalwater	28° 07′	24° 18′	3,700	10	23·87	3·2	22·6	55·8	18·4
Pretoria	28° 12′	25° 45′	4,350	24	29·45	2·9	27·3	49·8	20·0
Fouriesberg	28° 12′	28° 37′	5,900	19	30·08	4·4	27·0	46·4	22·2
Mount Fletcher	28° 30′	30° 42′	5,500	35	27·74	5·4	23·3	48·9	22·4
Newcastle	29° 56′	27° 45′	3,890	32	37·89	3·1	26·8	49·7	20·4
Lydenberg	30° 27′	25° 06′	4,820	22	24·81	2·4	27·5	52·0	18·1
Pietermaritzberg	30° 22′	29° 35′	2,272	31	36·94	4·6	27·2	45·5	22·7
Mbabane	31° 09′	26° 19′	3,800	23	55·59	3·9	25·5	48·6	22·0

Not only does the above table show how proportionately few are the recording stations in which winter rainfall predominates but that, without exception, they are relatively low-rainfall localities where this Mediterranean climate occurs. The area where winter rainfall is important is limited in extent and is located on the western side of South Africa, and as the east and north-east are approached so the maximum point in the rainfall moves from the winter to the spring, and finally into the summer. The position in this connection is such that it can almost be said for South Africa that it is a country of spring and summer rainfall, for only about one-sixth of the whole receives more than 50 per cent. of its rainfall in the six-months period covering autumn and winter. On the other hand about five-sevenths of the area of the Union gets 70 per cent. or more of its rain during the six-months period which includes the spring and summer seasons.

The concentration of the rainfall towards the end of the summer is probably seen more readily in the next table, where the months of maximum and minimum falls are shown for 513 recording stations, selected from various parts of the country.

The Months of Maximum and Minimum Rainfall in 513 Selected Stations in South Africa.

	Monthly Averages of Several Years.	
	Month of Maximum Rainfall.	Month of Minimum Rainfall.
	No. of Districts.	No. of Districts.
January	127	10
February	104	3
March	213	Nil
April	2	1
May	Nil	2
June	14	255
July	Nil	152
August	Nil	62
September	1	16
October	1	7
November	22	Nil
December	29	5
	513	513

AGRICULTURAL PRODUCTION OF SOUTH AFRICA.

Although the great bulk of the value of South Africa's production of primary products is derived from gold, large quantities of primary rural products of fairly high aggregate value are also raised each year, of which the principal items are wool, fresh fruits, sheep skins, hides, maize, meat, mohair, and wine. The value of the total exports from the country is about £75,000,000, of which about £48,000,000 are derived from gold and a little over £22,000,000 from produce of the land. Some of the details of agricultural production and exports are set out in the next two tables, which give an idea of the relative importance of the various rural activities of the country:—

Production and Exports of Principal Crops of South Africa.

Crop.	Production.			Exports in 1932-33.
	1911.	1921.	1930.	
	Tons.	Tons.	Tons.	Tons.
Maize	863,000	1,335,000	2,239,000	268,232
Kaffir Corn	155,000	155,000	177,000	14
Wheat	181,000	228,000	328,000	Importer
Oats	155,000	96,000	151,000	247
Barley	31,000	26,000	53,000	27
Potatoes	92,000	112,000	173,000	2,885
Tobacco	7,000	8,000	6,000	34
Sugar	82,000	144,000	299,000	146,228
Dried Grapes	1,127	7,036	4,295	4,690*
Dried Fruits (other)	—	2,973	5,720	2,641*
Wine—Gallons	7,501,000	16,945,000	15,899,000	888,875†
Brandy and Spirits—Gallons	1,318,000	2,803,914	2,835,555	34,372†
Fresh Fruits—				
Grapes	—	—	—	21,773
Pears	—	—	—	14,560
Plums	—	—	—	8,645
Peaches	—	—	—	5,660
Apples	—	—	—	3,160
Other	—	—	—	1,499
Citrus	—	—	—	130,230*
Wattle Bark	—	—	—	63,537
Wattle Bark Extract	—	—	—	20,939
Cotton (Raw)	—	—	—	518

* 1933. † Gallons.

Production and Export of Livestock of South Africa.

Animal.	Livestock.			Export of Products, 1932-33.
	1911.	1921.	1930.	
	No.	No.	No.	Tons.
Horses	719,000	920,000	868,000	—
Cattle	5,797,000	8,557,000	10,751,000	—
Sheep	30,657,000	31,730,000	48,520,000	—
Pigs	1,082,000	915,000	963,000	—
Goats	11,763,000	7,837,000	7,995,000	—
Mules and Asses	431,000	839,000	881,000	—
Ostriches	747,000	262,000	33,000	—
Fowls	—	—	8,089,968	—
Ducks	—	—	291,192	—
Turkeys	—	—	242,472	—
Geese	—	—	154,946	—
Wool (greasy)	—	—	—	183,599
Wool (other)	—	—	—	2,731
Beef	—	—	—	7,273
Bacon, Hams, and Lard	—	—	—	131
Meats (other)	—	—	—	112
Sheep Skins	—	—	—	17,131
Goat Skins	—	—	—	1,482
Hides	—	—	—	8,290
Mohair	—	—	—	2,873
Ostrich Feathers	—	—	—	21
Eggs—Dozens	—	—	—	5,396,160*
Cheese	—	—	—	993
Butter	—	—	—	1,929

* Dozens.

THE IMPORTANT CROPS OF SOUTH AFRICA.

Agriculturally, South Africa is largely a grazing country, nevertheless she maintains her population with home-grown crops, with a slight deficiency of wheat, which is more than compensated for by exports of other vegetable foodstuffs, and with intensive farming crops, such as fruits and grapes for wine, she is making steady and continuous progress. At present the crops of outstanding importance in the Union are maize, sugar cane, grapes, pears, plums, peaches, and citrus fruits, and the yields of all of these crops can be increased to a considerable degree by bringing new areas under the various crops, and improving the cultural methods.

Maize in South Africa.

Without doubt maize is the most important crop of South Africa, being grown over a greater area than others, is more widespread throughout the Union, and is the staple foodstuff of the native and poorer European portions of the population. So important as a foodstuff is maize that from 1,100,000 to 1,200,000 tons of grain are used annually.

South African maize has a good name in those countries to which it is exported, and this appears to be largely due to the fact that the weather during the ripening period is such that the harvested grain is relatively dry, and so it transports well and is very suitable for manufacturing purposes.

Production of Maize in South Africa.

Year.	Total *Production.*	Imports (net).	Local *Consumption.*	Exports of Maize Grown *in South* Africa.
	Tons.	Tons.	Tons.	Tons.
1910-11	770,760	651	644,010	127,401
1915-16	967,433	875	822,283	146,025
1920-21	1,191,717	11,531	1,006,176	197,072
1925-26	974,992	24,490	866,062	133,420
1930-31	1,429,286	23	1,266,500	162,809
1931-32	1,699,464	3	1,458,895	240,572
1932-33	744,734	29,763	665,135	109,362
1933-34	1,651,786*	—	1,150,000*	—

* Estimated.

[*From "Farming in South Africa."*]

A Well-Cared For Crop of a New Variety of Maize.
Maize is easily the most important crop of South Africa, and much work is being done by plant-breeders in several localities in the Union to produce improved varieties for each particular maize-growing district.

Most of the maize crops of the Union are grown in Transvaal and Orange Free State, and the conditions of the principal maize-growing districts are admirably suited to the crop, the soils being from good to excellent, the rainfall sufficient, and the temperatures high and regular enough. Quite considerable areas yield over 10 bags per acre when the seasons are normal, and it is not a bit unusual for farmers to average 15 bags per acre over their whole crop.

Export of Maize.

Most of the maize exported, and some which is used for local consumption, passes through the grain elevators provided for the purpose in 1924. The exports are all controlled by Government inspectors, who grade all parcels submitted, and

issue Government certificates which are accepted by overseas buyers with confidence. So much maize passes through South Africa from neighbouring countries that the elevators handle for export a good deal more than the locally grown export grain, and since the inauguration of bulk handling the following quantities have been handled by the elevators:—

Handling Maize in South Africa's Elevator System.

Season.	Exported.	Local Consumption.	Total.
	Tons.	Tons.	Tons.
1924-25	45,040	30,439	75,479
1925-26	445,940	70,711	516,651
1926-27	14,741	103,563	118,304
1927-28	248,285	31,317	279,602
1928-29	341,933	83,067	425,000
1929-30	255,149	82,851	338,000
1930-31	438,566	132,612	571,178
1931-32	220,996	155,976	376,972
1932-33	311,826	170,574	482,400
Average of nine seasons	258,053	95,679	353,732

Wheat Growing in South Africa.

The production of wheat is the one agricultural activity which has a great attraction for most Europeans when they set about crop growing, no matter whether the natural conditions are suitable or not, and great efforts are often made to become self-contained in so far as wheat is concerned, even when more suitable crops are neglected. This is the case with South Africa as with so many other countries, but a study of the incidence of the rainfall, and a knowledge of the limited proportion of good soil where sufficient winter rainfall is received to suit wheatgrowing, shows how difficult of attainment this self-sufficiency with wheat is likely to be in the Union.

With restrictions on the importation of wheat and flour to the extent of bringing the cost of imported wheat to 6s. 9d. sterling per bushel, and a promise from millers to pay this figure to farmers for home-grown wheat, for one season, 1931-32, sufficient wheat was grown to supply all local needs, but despite this enormous increase in price above world parity, the need for importations of wheat persists.

Even with the high artificial price, the low yields obtained, due to unsuitable climatic conditions, damage by rust, and the existence of only moderate-quality soils, render wheatgrowing in much of the Union an uneconomic proposition.

Quite a fair amount of wheat is grown under irrigation, and this form of farming has been developed to a considerable extent of recent years with the locking of streams and the reclamation of river lands, but as the population grows, other more valuable irrigation crops than wheat will assuredly be grown.

Production of Wheat in South Africa.

Year.	Area Harvested.	Yield per Acre.	Total Yield.	Local Consumption.
	Acres.	Bush.	Bush.	Bush.
1927	793,539	7·2	5,674,617	12,739,950
1928	845,514	8·6	7,238,290	14,011,550
1929	1,111,839	9·6	10,625,537	14,699,483
1930	1,297,660	7·2	9,296,667	12,537,583
1931	1,779,400	7·7	13,713,333	16,174,183
1932	1,568,910	6·7	10,626,667	11,194,467
1933	1,288,980	7·9	10,226,667	—

FRUIT AND WINE IN SOUTH AFRICA.

The production of fruit and wine has rapidly become very important in South Africa, and this largely because of the great care exercised in preparing the articles for the export markets. This effort to capture and retain a market has been particularly successful where soft fruits are concerned, and fruits from the Union, and notably grapes, plums, and peaches, are said to open up in the British markets in as good a condition at least, as similar fruits from any other country sending them to Great Britain. That the progress made in the industry has been great in the past 20 years or so can be seen in the next table, where the number of trees from which fruit is picked for sale is set out for the two seasons 1911 and 1930:—

Commercial Fruit Trees in South Africa.

Kind of Fruit.	Commercial Fruit Trees.	
	1911.	*1930.*
	No.	No.
Apple	1,429,858	2,464,370
Pear	650,937	1,009,740
Plums	635,646	1,379,250
Peach	5,902,480	3,590,670
Nectarine	98,687	76,420
Apricot	1,025,193	2,190,820
Orange	985,602	3,883,350
Lemon	172,856	196,890
Mandarin	404,189	272,260
Mango	*96,685	230,840
Other fruits	602,020	1,792,570
Vines, acres	*48,358†	76,896†

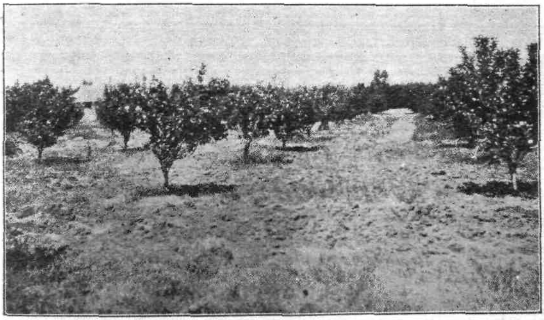
* 1918. † Acres.

The figures disclose a great increase in all kinds of fruits except peaches, nectarines, and mandarines, and as planting of new orchards of most other kinds is being continued each year, a further increase in production will be seen in the future.

Shipping Fresh Fruits to Europe.

Most of the fresh fruits, with the exception of citrus, are shipped from Capetown, and the arrangements for cooling and handling the fruit are really good, only that the quantities being handled have increased so rapidly that some congestion results in the busiest part of the season. The work of pre-cooling, cold storage, and loading of boats is expeditiously carried out with the minimum of hand labour, and very little double handling of the boxed fruit. Practically all fruit to be exported comes from within 110 miles of the port, and for the short journey, specially cooled railway vans are unnecessary, and ordinary louvred vans fulfil all requirements. On arrival by railway the boxes of fruit are stacked on trucks with wheels so small that the bottoms of the trucks are only a few inches off the ground, and so stacked that the labelled ends of all boxes are visible. The trucks have room for five rows of boxes, but the boxes for the centre row are stacked on top of the other four rows until the inspection is completed, and the labelled ends of boxes have been marked to show they have been passed by an inspector. The boxes in outside rows have labels facing outwards, whilst those in the second rows have their labels facing the alley-way where the middle row is to be stacked. As soon as the inspection is completed the surplus boxes on the four rows are stacked in the alley-way on the truck left for the purpose, and this small job is the only one in which there is any second handling of the boxed

fruit, from the time it is taken from the railway trucks until stacked in the ship's hold. As soon as the inspection and branding is completed a small electric motor hooks on to the truck loaded with fruit and hauls it into the pre-cooling chamber, where it is left until the temperature has been brought sufficiently low, when it is again connected to a motor which takes it to the cool stores, to remain until a boat is ready to receive the fruit. The Cold Stores at Capetown consists of a four-storey concrete building which runs the whole length of a long wharf, the top two stories being continuous, but the ground and first floors are broken in several places with wide openings, to admit of all kinds of traffic from the land to the side of the ships. The non-continuous floors consist of the pre-cooling chambers, whilst the top floors are the cold stores where temperatures are lowered to the ideal for holding the particular kind of fruits being exported at the time. Fruit that has to be taken from any floor to one that is higher is hauled by an electric motor to a lift in the close vicinity, the truck containing the boxes of fruit is pushed on to the lift by the motor, and on arrival at its destination a similar motor hooks on to the truck and takes it to the chamber where it is to be stored.



An Orchard of Young Fruit Trees.
South Africa is an important producer and exporter of fruits of most kinds, and not only grows the fruits well, but prepares them for the overseas markets so efficiently that they open up in Great Britain in as good, if not better, condition than the same kinds of fruit sent from other countries.

The chambers of the cold stores have doors on the inside which open to admit the trucks of fruit, and doors on the wharf side to allow the pushing of the trucks on to a platform outside of each doorway, from which the travelling wharf-crane picks up truck and all and lowers it down the ship's hold. This putting of the truck loads of fruit into one side of the cool chambers and out the other side, and right into the hold of the ship is done with the minimum of labour, and perhaps of more than equal importance, with the least possible change of temperature.

This method of handling fruit from railway truck to ship's cool chambers can only be carried out efficiently when plenty of lifts are available of sufficient size to take at least one truck and its load, from one floor to the other with some speed.

The handling of export fruit is facilitated in South Africa by the insistence on the use of a specified coloured wooden cleat on the boxes for every different kind of fruit, no matter in what part of the Union the fruit is packed. For instance, all boxes of grapes have blue cleats, pears have green, and so on for every different

kind of fruit, and the convenience of knowing what is inside the boxes by the bright colours of the cleats is a great one indeed, particularly when it becomes necessary to use unskilled labour in shifting consignments.

To reduce the congestion at the Capetown Cold Stores inspectors are sent into the more important country fruit-growing centres to inspect and pass fruit for export at the packing sheds. This appears to have served its purpose fairly well, and gratifies country dwellers quite a lot.

Barges as Cool Stores.

Port Elizabeth is an important shipping port for citrus fruits, and from this place about 800,000 cases of these fruits were shipped last year, and it was estimated that the amount would be increased to 1,000,000 cases this season. The port is only in the making, and until further breakwaters and wharves are completed, temporary arrangements for the handling of fruit for export have been made, and the method adopted appears to be excellent for the cooling and holding of perishable foodstuffs for partly developed shipping centres. The refrigeration plant is located on the jetty, and the cooling chambers consist of insulated barges tied nearby. In Port Elizabeth, 19 barges are insulated for the purpose, and by pumping cooled brine from the plant on the jetty to the barges, and passing air over the tubes to the boxes of fruit, temperatures from 30° F. to 34° F. are easy to maintain until the fruit is shipped.

Research Work on Cold Storage.

Although South Africa has been so successful in the preparation for marketing, and the delivery in Europe in really good order of her perishable products, she intends to improve still further the methods of packing and cooling, and for the purpose is undertaking considerable research work on the matter. An up-to-date Cool-storage Research Laboratory is rapidly approaching completion in Capetown, and when finished should admit of the carrying out of work of a more accurate nature than was possible in the past, and should be strictly comparable to commercial practices. The building and equipment was sufficiently advanced to occupy it in December, 1934, and detailed and careful work on the wastage of fruits has been conducted throughout the fruit season. Fruit has been kept at various temperatures, between the known ranges of temperature for each fruit, for the maximum time any South African fruit would be held, which is 25 days, and then for a further 10 days at store temperatures to cover the selling period, and after the full time was up a detailed examination was made of the fruit.

Provision is being made in the laboratory for conducting extensive tests with gases such as nitrogen, carbonic acid gas, and oxygen, and the results should be of the utmost interest to all people dependent upon cold storage to market their products.

Field Work with Fruit.

Because of the importance of the fruitgrowing industry, and the recognition of the possibilities of expanding it, the South African Department of Agriculture is doing a considerable amount of research work on all phases of horticulture. In the south-west portions of the country, gardens are maintained for investigating the problems connected with deciduous fruits and vines, whilst in the warmer climate of the sub-tropical zone, citrus and tropical fruits are experimented with.

Of the less well-known fruits, it is recognised in the Union that the paw-paw is becoming increasingly popular, and that some day it will be one of the very important fruits of the world, and consequently work in connection with the improvement of this fruit is being undertaken on a fairly considerable scale. At the Nelspruit Horticultural Experiment Station the work has progressed so far that a great improvement in the shape of the fruits has already been brought

about, and as shape appears as a fixed character in the breeding work conducted at the above institution, it seems that one of the principal packing troubles experienced with paw-paws is likely to be definitely overcome in the near future. There are also indications that tougher skins can be obtained on good-shaped fruits without sacrificing quality of flesh, and if this proves to be so, the marketing scope of this popular fruit will be considerably extended.

[*From "Farming in South Africa."*]

A Grove of Paw-Paw Trees in Fruit.
On present appearances the Paw-paw is likely to become one of the very important fruits of the world, and this is recognised in South Africa to the extent that considerable work is being carried out towards breeding types of fruit of improved shape, and with better carrying properties.

Varieties of Fruit Grown for Export.

A really large assortment of varieties of all the various kinds of fruits are exported, but with each kind a few predominate, and only very small quantities of most other varieties are shipped out of the country. The relative importance for export of the different fruits, and the different varieties of fruit, are shown below for the season 1932-33:—

Importance of Various Fruits (Non-citrus) Exported from South Africa in 1932-33.

Fruit.	Tons (40 cub. ft.).	Percentage.
Grapes	21,773	39·4
Pears	14,560	26·3
Plums (and prunes)	8,645	15·6
Peaches	5,660	10·2
Apples	3,160	5·7
Nectarines	676	1·2
Melons	326	0·6
Apricots	322	0·6
Mangoes	61	0·1
Grenadillas	36	0·1
All others	78	0·2